9
.97P

LIBRARY
RECEIVED
APR 28 1941
U. S. Department of Agriculture

THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXV Number 7

April 15, 1941

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Volume XXV Number 7

April 15, 1941

IN THIS ISSUE

With a few exceptions Fusaria found associated with rootrots of cereals and grasses in the Northern Great Plains were of species considered to be of slight or minor pathogenic importance, according to W. L. Gordon and Roderick Sprague, page 168.

E. S. McFadden reports that, given favorable weather, rapid development of wheat and oats leaf rusts and stem rusts can be expected in Texas, page 180.

Alma M. Waterman sends an annotated list of tree disease specimens received at the New Haven Office of the Division of Forest Pathology, page 181.

Glenn Gardner Hahn reports on the incidence of cedar blight in 1940, page 186.

William Bridge Cooke has listed some fungi collected in southern Ohio, page 190.

E. M. Hildebrand comments on the longevity of the crown gall organism, page 200.

Brief notes, page 202, include reports on the persistence of Phytomonas lapsa on field corn seed, by P. A. Ark; infection of garlic by onion rust, by C. E. Yarwood and M. W. Gardner; botrytis stem-rot on tomato in a Maryland greenhouse, by Carroll E. Cox; white rust on Texas spinach, by E. L. Felix; tobacco downy mildew, by J. G. Gaines and T. W. Graham; and the development of apple scab in Pennsylvania, by R. S. Kirby.

Check list revision, by Freeman Weiss, page 204.

March weather, page 211.

SPECIES OF FUSARIUM ASSOCIATED WITH ROOTROTS OF THE GRAMINEAE IN THE NORTHERN GREAT PLAINS 1/

W. L. Gordon 2/and Roderick Sprague 3/

One of the common genera of fungi associated with gramineous rootrots in North Dakota is Fusarium. Sometimes species of Fusarium are found to the exclusion of all other fungi, but typically they are associated with species of Helminthosporium, Pythium, Phoma, Gloeosporium, and a number of other common soil fungi. This note deals with the species of Fusarium found to be associated with rootrots of the Gramineae collected during the summer of 1940 in the Northern Great Plains. The specimens from South Dakota were collected largely by Mr. Wayne Austin, Assistant Regional Supervisor, Nursery Division, Soil Conservation Service, or by Mr. Austin and the junior author, in May and early June, 1940. Mr. Austin's aid is greatly appreciated.

Isolations were made after surface sterilization of diseased parts of plants for 1-3 minutes in calcium hypochlorite (48 grams in 450 cc. water) followed by washing in sterile water and incubating at room temperature either on potato dextrose agar or non-nutrient agar. Others, without surface sterilization, were washed overnight in running water and incubated on non-nutrient agar.

The nomenclature followed in the identification of the various species and varieties of Fusarium is that of Wollenweber and Reinking 4/ except for members of the Section Elegans which were placed in Fusarium oxysporum Schlecht. as emended by Snyder and Hansen 5/. In naming the various species of cereals and grasses, Hitchcock's 6/ nomenclature was followed wherever possible.

1/ Cooperative investigations between the Division of Cereal Crops and Diseases, Forage Crops and Diseases, and Dry Land Agriculture, Bureau of Plant Industry; and Division of Nurseries, Soil Conservation Service, U. S. Department of Agriculture; the North Dakota Agricultural Experiment Station; the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada (Division of Botany and Plant Pathology, Contribution No. 661).

2/ Plant Pathologist, Dominion Laboratory of Plant Pathology, Winnipeg, Manitoba.

3/ Associate Pathologist, Division of Cereal Crops and Diseases, U. S. D. A., Northern Great Plains Field Station, Mandan, North Dakota.

4/ Wollenweber, H. W., and O. A. Reinking. Die Fusarien, ihre Beschreibung, Schadwirkung und Bekämpfung. Paul Parey, Berlin, 1935.

5/ Snyder, W. C., and H. N. Hansen. The species concept in Fusarium. Amer. Journ. Bot. 27: 64-67. 1940.

6/ Hitchcock, A. S. Manual of the grasses of the United States, U. S. Dept. Agr. Misc. Publ. No. 200, 1935.

Table 1. Alphabetical list of the species and varieties of Fusarium isolated from rootrot collections of cereals and grasses collected in the Northern Great Plains during 1940.

Species and Varieties	
Fusarium culmorum (W. G. Sm.) Sacc.	F. scirpi var. acuminatum (Ell. & Ev.) Wr,
F. equiseti (Cda.) Sacc.	F. scirpi var. compactum Wr.
F. graminearum Schwabe	F. scirpi var. longipes (Wr. & Rg.) Wr.
F. moniliforme Sheld.	F. solani (Mart. pr. p.) App. & Wr.
F. oxysporum (Schlecht.) em. Snyder and Hansen	F. solani var. martii (App. & Wr.) Wr.
F. poae (Pk.) Wr.	F. sporotrichioides Sherb.
F. scirpi Lamb. & Fautr.	

An alphabetical list of the species and varieties of the genus Fusarium isolated from rootrot specimens of cereals and grasses collected during 1940 in the Northern Great Plains is given in Table 1. Nine species and four varieties of Fusarium were isolated representing six sections of the genus (Table 2). The isolation of Fusarium Scirpi Lamb. and Fautr. var. longipes (Wr. and Rg.) Wr. from Agropyron trachycaulum (Link) Malte, Bromus inermis Leyss., and Sorghum vulgare Pers. constitutes the first record of this fungus on these hosts as well as the first record of it in North America.

The frequency of isolation of the various species of Fusarium obtained from collections of cereals and grasses made during successive, approximately 15 day periods from May 12 to August 15, 1940, is shown in Table 2. Certain species of Fusarium were isolated much more frequently than others. Of a total of 1,715 isolations, Fusarium equiseti accounted for 785 isolations, or 45.77 percent; F. oxysporum for 750, or 43.73 percent; and F. scirpi var. acuminatum for 109, or 6.36 percent. Fusarium equiseti was the most frequently isolated species from collections obtained during the early part of the season, May 12 to June 30, while F. oxysporum predominated in the isolations from July 1 to August 15. Fusarium scirpi var. acuminatum was isolated more frequently than F. oxysporum from collections made during May 12 to 31, but much less frequently later in the season.

Although Fusarium equiseti, F. oxysporum, and F. scirpi var. acuminatum constituted 95.86 percent of the total number of isolations, none of these species are generally recognized as serious pathogens of the roots of cereals and grasses. On the other hand, F. graminearum and F. culmorum are known to be distinctly pathogenic on cereals and grasses but were rarely isolated (Table 2). Together, they comprised only 0.18 percent of the total isolations.

Table 2. The frequency of isolation of Fusarium species obtained from rootrot collections of cereals and grasses during successive approximately 15-day periods from May 12 to August 15, 1940.

Section and species	May 12-31	June 1-15	June 16-30	July 1-15	July 16-31	August 1-15	Total isolations	
							No.	Percent
Sporotrichiella								
F. poae		1		2			3	.17
F. sporotrichioides	2	7	9	2		1	21	1.22
Gibbosum								
F. equiseti	87	122	214	142	161	59	735	45.77
F. scirpi	2	7	5	2	1	3	20	1.17
F. scirpi var. acuminatum	26	15	19	20	15	14	109	6.36
F. scirpi var. compactum			2			1	3	.17
F. scirpi var. longipes		2	2	1			5	.29
Discolor								
F. culmorum				1			1	.06
F. graminearum				2			2	.12
Liseola								
F. moniliforme		6			1		7	.41
Elegans								
F. oxysporum	22	52	100	192	306	78	750	43.73
Martiella								
F. solani		2		1			3	.17
F. solani var. martii	1		2		1	2	6	.35
Total isolations each period	140	214	353	365	485	158	1715	
Relative soil moisture	Moist	Inter-mediate	Dry	Dry	Dry	Moist		

Table 3. Cereals and grasses collected during 1940 in the Northern Great Plains, together with the frequency of isolation of each of the various species of Fusarium obtained from them.

Hosts	F. poae	F. sporotrichioides	F. equiseti	F. scirpi	F. scirpi var.acuminatum	F. scirpi var. compactum	F. scirpi var. longipes	F. culmorum	F. graminearum	F. moniliforme	F. oxysporum	F. solani	F. solani var. martii	Total number isolations from each host
Agropyron amurense Drob.(P.I.135,550)			2								2			4
Agropyron ciliare (Trin.) Franch. (P.I.135,551)			2											2
Agropyron cristatum (L.) Gaertn.			35		17						35		1	88
Agropyron dasystachyum (Hook.)Scribn.											2			2
Agropyron elongatum (Host) Beauv. (U.S.S.R. int.)			13		4	1					4			22
Agropyron intermedium(Host)Beauv.			15								5			20
Agropyron repens (L.) Beauv.			17		3						11			31
Agropyron sibiricum (Willd.)Beauv.		3			1						6			10
Agropyron smithii Rydb.		3	17								9			29
Agropyron subsecundum(Link) Hitchc.					1				2					3
Agropyron trachycaulum(Link)Malte		1	18		1		1				9			30
Arthraxon hispidus var. cryptatherus (Hack.)Honda(P.I. 135,559)			10								2			12
Avena fatua L.			2								6			8
Avena nuda L.			1								8			9
Avena sativa L.			7		1						73			81
Boutelcua curtipendula (Michx.)Torr.			5		1						1			7
Bromus inermis Leyss.	3		44		9	1	3				30			90

Hosts	F. poae	F. sporotrichioides	F. equiseti	F. scirpi	F. scirpi var. acuminatum	F. scirpi var. compactum	F. scirpi var. longipes	F. culmorum	F. graminearum	F. moniliforme	F. oxysporum	F. solani	F. solani var. martii	Total number isolations from each host
Bromus madritensis L.			3								2			5
Bromus tectorum L.			2		1									3
Buchloë dactyloides (Nutt.) Engelm.			3											3
Distichlis spicata (L.) Greene											2		2	4
Echinochloa crusgalli (L.) Beauv.			4		1			1			4			10
Elymus canadensis L.			19								10			29
Elymus dahuricus Turcz.(P.I.135, 578)			8	2							1			11
Elymus junceus Fisch.		4	17	9	4									34
Elymus sibiricus L. (P.I.135, 582)			3								6			9
Hordeum brevisubulatum (Trin.) Link			1		1									2
Hordeum distichon L.			6								21			27
Hordeum jubatum L.		2	3			1								6
Hordeum vulgare L.			68		5						63	2		138
Koeleria phleoides (Vill.) Pers.			8								5			13
Muhlenbergia japonica Steud.(P.I.135, 606			2								1			3
Oryzopsis hymenoides (Roem.and Schult.) Ricker		3	32		2						6			43
Panicum capillare L.			1		2									3
Panicum miliaceum L.			5		2						8			15
Panicum virgatum L.			8											8
Phalaris tuberosa L.			11											11
Phleum pratense L.			5											5
Poa compressa L.			4		1									5
Poa palustris L.			3		3									6
Poa secunda Presl.			2											2
Secale cereale L.			2		1									3

Hosts	F. poae	F. sporotrichioides	F. equiseti	F. scirpi	F. scirpi var. acuminatum	F. scirpi var. compactum	F. scirpi var. longipes	F. culmorum	F. graminearum	F. moniliforme	F. oxysporum	F. solani	F. solani var. martii	Total number isolations from each host
Setaria italica (L.) Beauv.			15		2						13			30
Setaria viridis (L.) Beauv.			30		4						19		1	54
Sorghum vulgare Pers.			18				1			1	22	1		43
Sorghum vulgare var. sudanense (Piper) Hitchc.			7	2							19			28
Sporobolus cryptandrus (Torr.) A.Gray					2						3			5
Stipa comata Trin. and Rupr.			2								5			7
Stipa sibirica (L.) Lam.			3								7			10
Stipa spartea Trin.			5											5
Stipa viridula Trin.		1	16								6			23
Triticum aestivum (L.)		4	195	6	23						198			426
Triticum dicoccum Schrank			2		4						2			8
Triticum durum Desf.			71	1	13						114		2	201
Zea mays L.			13							6	10			29
Total number of isolations of species of Fusarium	3	21	785	20	109	3	5	1	2	7	750	3	6	1715

A list of the cereals and grasses collected during 1940 in the Northern Great Plains, together with the frequency of isolation of each of the various species of Fusarium obtained from them, is given in Table 3. Fusarium species were isolated from 55 species and varieties of host plants representing 24 genera of the Gramineae. Fusarium equiseti, F. oxysporum, and F. scirpi var. acuminatum had the widest host range and were the most frequently isolated. Bromus inermis yielded the greatest number of species or varieties of Fusarium, with 6, followed by Agropyron trachycaulum, Sorghum vulgare, Triticum aestivum, and Triticum durum with 5.

The geographic distribution and host range of the species of Fusarium isolated from rootrot collections of cereals and grasses made in the Northern Great Plains during 1940 are presented in Table 4. All of the 13 species and varieties of Fusarium isolated were present in the collections made in North Dakota. Fusarium poae, F. sporotrichioides, F. equiseti, F. scirpi var. acuminatum, F. scirpi var. longipes, F. oxysporum, and F. solani var. martii were also isolated from collections made in South Dakota. In addition, F. equiseti occurred in collections originating in Montana, Minnesota, and Nebraska while F. oxysporum was also found in Nebraska.

Pathogenicity studies with cultures of the various species and varieties of Fusarium isolated are in progress at the Northern Great Plains Field Station, Mandan, North Dakota. As compared with certain strains of Helminthosporium sativum neither Fusarium equiseti nor F. oxysporum, the 2 most frequently isolated species, appeared in preliminary trials to be very pathogenic on Agropyron cristatum (Mandan standard), Avena sativa, Bromus inermis, Elymus junceus, Hordeum vulgare, and Triticum aestivum. In contrast, F. culmorum and F. graminearum were very parasitic on these hosts. F. scirpi var. acuminatum on these same hosts appears to be weakly parasitic to definitely pathogenic, depending on the race or isolate.

Table 4. Geographical distribution and host range of the Fusarium species isolated from rootrot collections of cereals and grasses made in the Northern Great Plains during 1940. 1/

SECTION SPOROTRICHIELLA

Fusarium poae	
Bromus inermis	- Mandan, North Dakota, Alcester, South Dakota.
Fusarium sporotrichioides	-
Agropyron sibiricum	- Mandan, N. Dak.
Agropyron smithii	- Alcester, S. Dak.
Agropyron trachycaulum	- Mandan, N. Dak.
Elymus junceus	- Vermillion, S. Dak.
Hordeum jubatum	- Emerado, N. Dak.
Oryzopsis hymenoides	- Mandan, N. Dak.
Stipa viridula	- Brookings, S. Dak.
Triticum aestivum	- McCanna, N. Dak.

1/ All of the species of exotic grasses listed from Mandan, N. Dak., were growing in plots on the Northern Great Plains Field Station.

SECTION GIBBOSUM

Fusarium equiseti

Agropyron amurense	- Mandan, N. Dak.
Agropyron ciliare	- Mandan, N. Dak.
Agropyron cristatum	- common from Nebraska to Canada. Dickinson, Fargo, Langdon, Mandan, McCanna, N. Dak.; Carpenter, Cavour, Hecla, Winner, S. Dak.
Agropyron elongatum	- Mandan, N. Dak.
Agropyron intermedium	- Mandan, N. Dak.
Agropyron repens	- Brocket, Mountain, Park River, N. Dak.
Agropyron smithii	- Gaylord, Mandan, N. Dak.; Alcester, Chamberlain, Winner, S. Dak.
Agropyron trachycaulum	- Mandan, McCanna, N. Dak.; Hecla, S. Dak.
Arthraxon hispidus var. cryptatherus	- Mandan, N. Dak.
Avena fatua	- McCanna, N. Dak.
Avena nuda	- Dickinson, N. Dak.
Avena sativa	- Mandan, N. Dak.
Bouteloua curtipendula	- Mandan, N. Dak.
Bromus inermis	- Fargo, Mandan, N. Dak.; Alcester, Cavour, Fort Thompson, Vermillion, S. Dak.; Albion, Nebraska.
Bromus madritensis	- Mandan, N. Dak.
Bromus tectorum	- Park River, N. Dak.
Buchloë dactyloides	- Park River, N. Dak.
Echinochloa crusgalli	- Dickinson, N. Dak.
Elymus canadensis	- Dickinson, Mandan, Park River, Williston, N. Dak.
Elymus dahuricus	- Mandan, N. Dak.
Elymus junceus	- Langdon, Mandan, N. Dak.; Carpenter, Vermillion, S. Dak.
Elymus sibiricus	- Mandan, N. Dak.
Hordeum brevisubulatum	- Mandan, N. Dak.
Hordeum distichon	- Mandan, N. Dak.
Hordeum jubatum	- Mandan, N. Dak.
Hordeum vulgare	- Adams, Buxton; Field Station, Dickinson; Fargo, Gardner, Grand Forks, Grandin, Hillsboro, Lakota, Larimore, Mandan, McCanna, Mountain, Pembina, Spring Brook, Tower City, N. Dak.
Koeleria phleoides	- Mandan, N. Dak.
Muhlenbergia japonica	- Mandan, N. Dak.
Oryzopsis hymenoides	- Field Station, Dickinson; Mandan, N. Dak.

SECTION GIBBOSUM--Continued

Panicum miliaceum	- New Salem, Richardton, N. Dak.
Panicum capillare	- Winner, S. Dak.
Panicum virgatum	- Mandan, N. Dak.
Phalaris tuberosa	- Mandan, N. Dak.
Phleum pratense	- McCanna, N. Dak.
Poa compressa	- Lake Lida, Minn.
Poa palustris	- Bartlett, N. Dak.
Poa secunda	- in S.C.S. plots, Park River, N. Dak.
Secale cereale	- Mandan, N. Dak.
Setaria italica	- Langdon, New Salem, Roth, N. Dak.
Setaria viridis	- Arvilla, Dickinson, Fargo, Langdon, Minot, Richardton, Williston, N. Dak.
Sorghum vulgare	- Beach, Coburn, Fargo, Wild Rice, Surrey, N. Dak.
Sorghum vulgare var. sudanense	- Mandan, 8 miles East of Devils Lake, N. Dak.
Stipa comata	- Park River, N. Dak.
Stipa sibirica	- Mandan, N. Dak.
Stipa spartea	- Mandan, N. Dak.
Stipa viridula	- Fargo, Park River, N. Dak.; Brookings, Hecla, S. Dak.
Triticum aestivum	- 72 collections from which F. equiseti was isolated, were made from 41 locations in North Dakota and one in Montana. This fungus was abundant in all parts of North Dakota in the early part of the season and continued so until harvest in the eastern third of the State.
Triticum dicoccum	- Field Station, Dickinson; Turtle Mtn. Indian Res., N. Dak.
Triticum durum	- 18 collections were obtained from 15 locations in widely scattered parts of North Dakota including Clyde, Dickinson, Fargo, Gaylord, Langdon, Mandan, and New Rockford.
Zea mays	- Emerado, Leonard, Mandan, N. Dak.

Fusarium scirpi

Elymus dahuricus	- Mandan, N. Dak.
Elymus junceus	- Mandan, N. Dak.
Sorghum vulgare var. sudanense	- Hebron, N. Dak.
Triticum aestivum	- Mayville, Midway, N. Dak.
Triticum durum	- Bottineau, N. Dak.

SECTION GIBBOSUM--Continued

Fusarium scirpi var. acuminatum

Agropyron cristatum	- Dickinson, Fargo, Langdon, N. Dak; Cavour, Hecla, Winner, S. Dak.
Agropyron elongatum	- Mandan, N. Dak.
Agropyron repens	- Grand Forks, N. Dak.
Agropyron sibiricum	- Mandan, N. Dak.
Agropyron subsecundum	- Eagle Nest Siding, N. Dak.
Agropyron trachycaulum	- Mandan, N. Dak.
Avena sativa	- Dickinson, N. Dak.
Bouteloua curtipendula	- Mandan, N. Dak.
Bromus inermis	- Mandan, N. Dak.; Alcester, Hecla, S. Dak.
Bromus tectorum	- Park River, N. Dak.
Echinochloa crusgalli	- Dickinson, N. Dak.
Elymus junceus	- Mandan, N. Dak.; Winner, S. Dak.
Hordeum brevisubulatum	- Mandan, N. Dak.
Hordeum vulgare	- Adams, McCanna, N. Dak.
Oryzopsis hymenoides	- Dickinson, Mandan, N. Dak.
Panicum capillare	- Winner, S. Dak.
Panicum miliaceum	- New Salem, Richardton, N. Dak.
Poa compressa	- Lake Lida, Minn.
Poa palustris	- Bartlett, N. Dak.
Secale cereale	- Mandan, N. Dak.
Setaria italica	- Langdon, N. Dak.
Setaria viridis	- Fargo, N. D.
Sporobolus cryptandrus	- Eagle Nest Siding, N. Dak.
Triticum aestivum	- Argusville, Enderlin, Fargo, Hatton, Kathryn, Langdon, Mandan, McCanna, N. Dak.
Triticum dicoccum	- Turtle Mtn. Indian Res., N. Dak.
Triticum durum	- Bottineau, Drake, Langdon, Maza, McCanna, Mountain, N. Dak.

Fusarium scirpi var. compactum

Agropyron elongatum	- Mandan, N. Dak.
Bromus inermis	- Mandan, N. Dak.
Hordeum jubatum	- Emerado, N. Dak.

Fusarium scirpi var. longipes

Agropyron trachycaulum	- Mandan, N. Dak.
Bromus inermis	- Mandan, N. Dak.; Vermillion, S. Dak.
Sorghum vulgare	- Mandan, N. Dak.

SECTION DISCOLOR

Fusarium culmorum

Echinochloa crusgalli	- Dickinson, N. Dak.

SECTION DISCOLOR--Continued

Fusarium graminearum

Agropyron subsecundum	- Eagle Nest Siding, N. Dak.

SECTION LISECLA

Fusarium moniliforme

Sorghum vulgare	- Surrey, N. Dak.
Zea mays	- Emerado, N. Dak.

SECTION ELEGANS

Fusarium oxysporum

Agropyron amurense	- Mandan, N. Dak.
Agropyron cristatum	- Dickinson, Fargo, Mandan, N. Dak.; Carpenter, Huron, Winner, S. Dak.
Agropyron elongatum	- Mandan, N. Dak.
Agropyron dasystachyum	- Mandan, N. Dak.
Agropyron intermedium	- Mandan, N. Dak.
Agropyron repens	- Brocket, Park River, N. Dak.
Agropyron sibiricum	- Mandan, N. Dak.
Agropyron smithii	- Mandan, N. Dak.; Alcester, S. Dak.
Agropyron trachycaulum	- Mandan, N. Dak.
Arthraxon hispidus var. cryptatherus	- Mandan, N. Dak.
Avena fatua	- McCanna, N. Dak.
Avena nuda	- Mandan, N. Dak.
Avena sativa	- Bottineau, Dickinson, Fargo, Hebron, McCanna, Williston, N. Dak.
Bouteloua curtipendula	- Mandan, N. Dak.
Bromus inermis	- Mandan, N. Dak.; Alcester, Cavour, Huron, Winner, S. Dak.; Albion, Nebr.
Bromus madritensis	- Mandan, N. Dak.
Distichlis spicata	- Hebron, N. Dak.
Echinochloa crusgalli	- Langdon, Wild Rice, N. Dak.
Elymus canadensis	- Dickinson, Park River, Williston, N. Dak.
Elymus dahuricus	- Mandan, N. Dak.
Elymus sibiricus	- Mandan, N. Dak.
Hordeum distichon	- Field Station, Dickinson; Mandan; Branch Station, Williston; N. Dak.
Hordeum vulgare	- Adams; Field Station, Dickinson; Fargo, Grandin, Lakota, Mandan, McCanna, Tower City, N. Dak.
Koeleria phleoides	- Mandan, N. Dak.
Muhlenbergia japonica	- Mandan, N. Dak.

SECTION ELEGANS--Continued

Oryzopsis hymenoides	- Field Station, Dickinson; Mandan, N. Dak.
Panicum miliaceum	- McCanna, Richardton, N. Dak.
Setaria italica	- Langdon, New Salem, Surrey, N. Dak.
Setaria viridis	- Dickinson, Langdon, Richardton, Surrey, Williston, N. Dak.
Sorghum vulgare	- Fargo, Surrey, Wild Rice, N. Dak.
Sorghum vulgare var. sudanense	- Field Station, Dickinson; Hebron, Mandan, Wild Rice, 8 miles East of Devils Lake, N. Dak.
Sporobolus cryptandrus	- Eagle Nest Siding, N. Dak.
Stipa comata	- Park River, N. Dak.
Stipa sibirica	- Mandan, N. Dak.
Stipa viridula	- Park River, N. Dak.
Triticum aestivum	- 59 collections yielding F. oxysporum were made from 31 locations in widely distributed parts of North Dakota. This species was most prevalent in middle to late season in the western half of the state and at Fargo after late rains.
Triticum dicoccum	-Field Station, Dickinson; N. Dak.
Triticum durum	- Bartlett, Brocket, Clyde, Dickinson, Fargo, Fessenden, Gaylord, Langdon, Mandan, Maza, Mountain, New Rockford, Voltaire, N. Dak.
Zea mays	- Leonard, Mandan, N. Dak.

SECTION MARTIELLA

Fusarium solani

Hordeum vulgare	- McCanna, N. Dak.
Sorghum vulgare	- Coburn, N. Dak.

Fusarium solani var. martii

Agropyron cristatum	- Winner, S. Dak.
Distichlis spicata	- Niagara, N. Dak.
Setaria viridis	- Langdon, N. Dak.
Triticum durum	- Maza, N. Dak.

To Summarize: In the Northern Great Plains during 1940 Fusarium spp. appeared to be less important than Helminthosporium sativum in the common rootrot complex of cereals. Since at least 90 percent of the Fusarium isolations from cereals comprised Fusarium equiseti and Fusarium oxysporum, 2 comparatively weak cereal pathogens, and since isolations of Helminthosporium known to be definitely pathogenic far outnumbered those

of the species of Fusarium isolated, the secondary role of Fusarium in the production of rootrot in cereals during 1940 in the Northern Great Plains is strongly indicated. Isolations from grass hosts show a similar situation except that some of the species of grasses with slow growing seedling stages appear to be more susceptible to species of Fusarium than those grasses with more vigorous or more rapidly growing seedling phases. Therefore, continuation of the survey accompanied by pathogenicity trials are needed, and are in progress, as noted. Also it is important to know if the relative prevalence of the species of Fusarium remains more or less constant from year to year. On the basis of the fluctuation noted even in the first year, it is probable that yearly as well as seasonal differences in the number and relative abundance of species of Fusarium will occur. It is important to know if F. culmorum and F. graminearum, for instance, are continuously rare in the region. In the present investigations there was such a complexity of hosts involved that a relatively complete survey is particularly essential.

EARLY-SPRING INCIDENCE OF RUSTS OF WHEAT AND OATS IN TEXAS

E. S. McFadden

Since late September, slide exposures have shown the continued drift of rust spores into southern Texas from the North during periods of marked atmospheric disturbances.

Leaf rust [Puccinia rubigo-vera tritici] of wheat has been rampant throughout the greater part of the State ever since early December. Crown rust [P. coronata] of oats has been prevalent, since the latter part of January, in southern Texas in winter-oat pastures.

Infection centers of stem rust [P. graminis] of oats were found in oat pastures in the lower Rio Grande Valley, and around Crystal City during the first week in March. Stem rust of wheat was found in the wheat nursery at Weslaco in the lower Rio Grande Valley on March 3. At that time it appeared to be in the second generation but by March 5 another generation had appeared. It seems probable that the initial infection at Weslaco took place during the last week of January, and that the first sporulation occurred during a warm period between February 13 and 20.

No stem rust was found in the wheat or oat nurseries at Beeville on March 10, but it has since been reported in commercial fields of wheat as far north as Temple on March 5.

It is possible that initial infection by stem rust of both wheat and oats may have occurred over a considerable part of the State following spore showers during the last week in January, but sporulation has been retarded by unfavorable temperature. At College Station, after the freeze of mid-November, there were no periods of over two days duration with maximum temperature above 70° prior to March 22. Potted wheat plants,

hypodermically inoculated on February 28, and kept in the greenhouse where a temperature as high as 90° probably occurred, were producing pustules by March 10, whereas plants similarly inoculated, but kept outside of the greenhouse produced no pustules until March 23 following the first day with temperature above 70°.

On March 25 following temperatures of 72, 73, and 75 degrees F. on March 22, 23, and 24, respectively, initial pustules of stem rust were found in the field on both wheat and oats at College Station. This infection, in all cases, was on leaves or sheaths that had been exposed to the weather for 6 to 8 weeks, indicating that the infection may have occurred following spore showers of late January or early February.

At present, it appears that the stage is all set for an early and extremely severe epidemic of leaf rust of wheat and crown rust of oats throughout the greater part of the State. Given favorable temperatures, stem rust of both wheat and oats can also be expected to develop rapidly from now on, since there is a succulent growth of host material and an abundance of moisture in nearly all parts of the State.

(Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture.)

DISEASES OF SHADE AND ORNAMENTAL TREES: ANNOTATED LIST OF SPECIMENS RECEIVED IN 1940 AT THE NEW HAVEN OFFICE, DIVISION OF FOREST PATHOLOGY.

Alma M. Waterman

ACER

Anthracnose (Gloeosporium apocryptum): Michigan, Vermont, Virginia on A. saccharum.
Dieback (Phomopsis sp.): Rhode Island on A. palmatum.
Leaf blister (Taphrina sp.): Maryland and Virginia on A. rubrum; Virginia on A. saccharum.
Tar spot (Rhytisma acerinum): New Hampshire, on A. dasycarpum. (Rhytisma sp.): Ohio on A. platanoides.

This species of Rhytisma does not correspond exactly with either R. acerinum or R. punctatum. On the specimens received, the fungus formed large black spots on the upper leaf surface measuring about 1/2 - 1 inch in diameter. The raised tar-like appearance characteristic of R. acerinum was entirely lacking. On the lower surface the spots are light brown with numerous small black dots scattered along the veins. In transmitted light the spots have a net-like appearance due to the blackening of the tissue along the veins. The specimens were received in September and therefore only the summer stage of the fungus was present. The disease was reported by

E. W. Mendenhall as very prevalent on Norway maples in Lake County, Ohio.

AESCULUS HIPPOCASTANUM

Leaf blotch (Guignardia aesculi): New York.

AMPELOPSIS QUINQUEFOLIA

Leaf scab (Elsinoë sp.): New Hampshire

This fungus produces small white spots on the leaves and grayish white lesions on stems and fruit. No species of Elsinoë has been reported previously on this host. The identification of the fungus was confirmed by Dr. Anna E. Jenkins of the Division of Mycology and Disease Survey. The specimens were received in August from Marlboro, New Hampshire.

BETULA

Canker (Melanconium bicolor): Pennsylvania

CORNUS FLORIDA

Dieback (Phomopsis sp.): Tennessee

CORYLUS

Blight (Cryptosporella anomala): Maryland, North Carolina

CRATAEGUS

Leaf spot (Fabraea maculata): New York, Pennsylvania

CUPRESSUS ARIZONICA

Leaf blight (Macrophoma sp.): Alabama, Texas

Early in July 1940, specimens of a disease on Arizona cypress, from a 10-year-old ornamental tree at Birmingham, Alabama, were received for diagnosis. Occasional needles on the small twigs and particularly on the tips of the twigs were affected. Pycnidia with hyaline continuous spores, suggesting a species of Macrophoma, were present on the brown needles at the tips of the twigs. The owner of the tree stated that the disease had just recently become noticeable and seemed to be spreading throughout the tree. A little later in July, G. G. Hahn of the New Haven office received from A. A. Dunlap, Division of Plant Pathology and Physiology, Texas Agricultural Experiment Station, collections of diseased ornamental cedars and Arizona cypress for diagnosis as possible cedar blight (Phomopsis juniperovora) injury. The cedar blight fungus was not found in any of the Texas material (5). The Arizona cypress

specimens, however, showed a foliage blight which, according to a written communication (July 27, 1940) from Dr. Dunlap, appeared during the summer, giving the outside of the affected trees a scorched appearance. Mature pycnidia were conspicuous on the blighted needles and the fungus was identified tentatively by Dr. Hahn as Macrophoma cupressi (Cke. & Hark.) Berl. & Vogl. A comparison of the fungus on the Texas specimens with that from Alabama showed that the organism was identical. A similar disease, attributed to M. cupressi, was reported in 1932 by E. West as a blight on Cupressus sp. in Florida (PDR Suppl. 85:65. June 15, 1933), and in 1935 by J. J. Taubenhaus as a leaf blight of C. pyramidalis in Texas (PDR Suppl. 96:244. Dec. 31, 1936). The fungus Macrophoma cupressi is synonymous with Sphaeropsis cupressi which was originally described in 1884 by Cooke and Harkness (2) as having hyaline continuous spores and occurring in the bark of Cupressus macrocarpa in California. In 1886 when the genus Macrophoma was established by Berlese and Voglino the organism was transferred to that genus (6) since Cooke and Harkness had reported the occurrence of hyaline continuous spores only. In 1881 Cooke and Harkness had described also the fungus Diplodia cyparissa (1) with hyaline continuous spores becoming brown 1-septate, occurring on branches of C. macrocarpa in California. Both Macrophoma and Sphaeropsis are now commonly recognized as representing growth stages in the development of Diplodia. Therefore, it is possible that the original Macrophoma cupressi (Sphaeropsis cupressi) and Diplodia cyparissa represented spore forms of one fungus.

In 1924 a specimen consisting of the diseased top of a 60-foot Italian cypress (Cupressus sempervirens var. pyramidalis) in an ornamental planting at Augusta, Georgia, was received at the branch office of Forest Pathology formerly located in Providence, Rhode Island. The report of the examination made by N. C. Howard of that office states that pycnidia of a Macrophoma-like fungus with hyaline continuous spores were present on a canker on the atrophied trunk. A few slightly colored continuous spores were present, as well as occasional brown 1-septate spores. The organism seemed to correspond with the descriptions of both Macrophoma cupressi and Diplodia cyparissa. It was reported as a possible wound parasite in this case. A comparison of the hyaline spores of this fungus with those from the 1940 Alabama and Texas material shows slight differences in structure and shape. The spores from the Georgia specimen are typical of the hyaline spores commonly occurring as an early stage in the development of other species of Sphaeropsis or Diplodia, while those from the Alabama and Texas material do not have the characteristic heavy spore wall and are frequently irregularly curved. The measurements of the spores from all three sets of specimens mentioned correspond very closely with those reported by Cooke and Harkness, being within the range 20-30 x 9-15 microns.

It is evident, therefore, that there is an injurious leaf blight of species of Cupressus in the Southern States with which is associated a Macrophoma-like fungus. Further study would be necessary, however, to determine whether this fungus is identical with Macrophoma cupressi (Cke. & Hark.) Berl. & Vogl. or whether it is a new unnamed species.

The fungus on the Georgia specimen is probably Diplodia cyparissa Cke. & Hark.

ELAEAGNUS ANGUSTIFOLIA

Canker (Fusarium sp.): Wyoming

Basal cankers with excessive gummosis on the trunks of young Russian olive trees showed considerable fungus mycelium in the affected areas. A species of Fusarium was consistently isolated from the cankers. The exact identity of the species has not been determined. The specimens were from trees used in hedges in farm plantings.

FAGUS AMERICANA

Leaf spot (Gloeosporium fagi): New Jersey

FRAXINUS

Rust (Puccinia fraxinata): Pennsylvania.

JUNIPERUS VIRGINIANA

Rust (Gymnosporangium juniperi-virginianae): Colorado, Maryland, Illinois, Ohio, Wyoming.

LIBOCEDRUS DECURRENS

Canker (Sphaeropsis sp.): Georgia

MACLURA POMIFERA

Wilt (Verticillium sp.): Connecticut.

Young osage orange trees growing in the City nursery at New Haven were reported to be showing a sudden wilting similar to that caused by the verticillium wilt in maples. Sections through the affected branches showed an orange-brown streaking of the wood. Cultures produced a Verticillium resembling the species infecting maples. No previous report of a Verticillium on osage orange in the United States has been found, but in Italy Goidanich (3) reported the disease on nursery trees of M. aurantiaca (M. pomifera) growing near infected trees of Acer pseudoplatanus and A. platanoides.

MAGNOLIA GRANDIFLORA

Leaf spot (Hendersonia magnoliae): Virginia

The fungus forms irregular grayish white leaf spots scattered over the leaf surface and also along the leaf margins. It has been reported

(7) on M. grandiflora in France and Italy, but, so far as known, this is the first report in the United States.

PICEA

Tip blight (Ascochyta piniperda): Maine
Canker (Cytospora kunzei): Massachusetts, New York
Needle cast (Lophodermium filiforme): Alaska
Snow blight (Phacidium infestans): Maine

Among the specimens of native spruce seedlings in this collection, one small tree, which had apparently been killed by the snow blight, showed fruiting bodies of a species of Phomopsis on the main stem. The species was identified by G. G. Hahn as P. conorum, a saprophyte which he has described (4) as occurring on dead parts of Picea sitchensis and on fallen cones of P. excelsa in Great Britain. So far as known, Phomopsis conorum has not been previously reported in the United States and for this reason mention of it is made at this time.

Leaf cast (Rhizosphaera sp.): Virginia on P. pungens

PINUS

Brown spot (Septoria sp.): Kansas, Virginia, on P. nigra.
(Septoria spadicea): New Hampshire on P. strobus
Tip blight (Sphaeropsis ellisi): Iowa on P. montana; Iowa, Massachusetts, on P. nigra.

PLATANUS OCCIDENTALIS

Anthracnose (Gnomonia veneta): Maryland, Massachusetts, Missouri, Pennsylvania.

PRUNUS

Dieback (Phomopsis sp.): District of Columbia.

QUERCUS

Anthracnose (Gnomonia veneta): District of Columbia, Maryland, New Jersey, Pennsylvania.
Leaf blister (Taphrina coerulescens): Connecticut

ULMUS

Canker (Cytospora sp.): Texas, Wyoming, on U. parvifolia.[1/]

[1/] The specimens listed here as U. parvifolia were sent in as collected from "Chinese elms". Since there seems to be considerable confusion among tree owners in distinguishing between Chinese and Siberian elms it is not known definitely whether these are U. parvifolia or U. pumila. The specimens received were inadequate for a definite determination.

Anthracnose (Gloeosporium ulmicolum): Kansas, Tennessee, on U. parviflora.
Black leaf spot (Gnomonia ulmea): Mississippi on U. americana.
Canker (Libertella sp.): Colorado on U. parvifolia
Dieback (Phomopsis oblonga): New Jersey on U. americana

Literature Cited

1. Cooke, M. C. and Harkness, W. H. Notes on California fungi. Grevillea 9:81-87. 1881.

2. ---------- and ----------. California fungi. Grevillea 13:16-21. 1884.

3. Goidanich, G. La verticilliosi dell' Acer platanoides L. dell' Acer pseudoplatanus L. e della Maclura aurantiaca L. Boll. R. Staz. Pat. Veg. N. S. 14 (2):268-272. 1934. Summary in Rev. Appl. Myc. 13:811.

4. Hahn, G. G. Life history studies of the species of Phomopsis occurring on conifers. Part I. Trans. Brit. Mycol. Soc. 15:32-93. 1930. (pps. 58-61).

5. Hahn, G. G. Reports of cedar blight in nurseries in 1940. Plant Disease Reporter 25: 186-190, 1941.

6. Saccardo, P. Sylloge Fungorum 10:189. 1892.

7. Stevenson, John A. Foreign plant diseases, p 107. 1926.

(Division of Forest Pathology, Bureau of Plant Industry, cooperating with the Osborn Botanical Laboratory, Yale University, New Haven, Connecticut.

REPORTS OF CEDAR BLIGHT IN 1940 AND NOTES ON ITS PREVIOUS OCCURRENCE IN NURSERIES

Glenn Gardner Hahn

Cedar blight (Phomopsis juniperovora Hahn) (1) in recent years has become one of the most refractory problems in nurseries of the States of the Mississippi Valley where cedars are propagated. The disease is regarded as particularly serious by growers in this region because eastern red cedar (Juniperus virginiana L.) has increased in popularity for farmstead windbreaks.

In Iowa (4, p. 57) and Missouri, cedar blight in nurseries at Ames and Elsberry, respectively, was not nearly as active in July 1940 as it had been during the past three years, according to information received from George Y. Young, Civilian Conservation Corps and U. S. Department of Agriculture, Bureau of Plant Industry.

Mr. Young ascribed the slight incidence of disease at that time of year as being due to the very dry spring. He stated, "Not only the cedar blight but many of the leaf diseases, which normally are serious in this locality, this year have been very scarce". At the time, Mr. Young submitted to the writer diseased material of red cedar from Elsberry from which pure cultures of Phomopsis juniperovora were isolated. By September, however, the disease picture in nurseries of Iowa, a State in which blight has been destructive during a long period covering many years of cedar production (3. p. 52), had changed greatly. In a second communication from Mr. Young he described an epiphytotic of cedar blight in two Iowa nurseries, which commenced about the third week in July, and which reached alarming proportions, becoming more severe than damaging epiphytotics experienced in 1937 and in 1938. In a 2-acre area planted with red cedars, 2000 seedlings examined by Mr. Young were found to be 100 percent infected. The rapid spread of the disease, however, became very much reduced about the first week in September with the inception of dry weather. "To appreciate how fast the disease was spreading during the period from July 20 to September 1" wrote Mr. Young, "the entire stock was rogued 3 times and in some cases 4 times, with a total loss of approximately 30 percent." According to Mr. Young's observations cedar blight was quiescent during the dry cold spring but became rampant with the coming of unusually wet and cool weather in July and August, two months which normally are hot and dry.

In eastern Nebraska, blight caused by Phomopsis juniperovora was probably the worst during 1940 that it had been in recent years (4, p.58), according to a letter received from Ernest Wright, Division of Forest Pathology, Lincoln, Nebraska. This record repeats past experience with the disease in that State (3, p.52) where nurseries about 1916 and 1917 suffered practically total loss of large seed-bed plantings. Mr. Wright submitted diseased 3-0 and 1-0 stock of eastern red cedar and 1-0 stock of Rocky Mountain juniper (Juniperus scopulorum Sarg.) collected at a nursery at Fremont. The latter was infected as badly as the former. A diagnosis of this material made by the writer showed typical P. juniperovora present abundantly on both species. In a previous publication (1) it was stated that in the Middle West, J. virginiana appeared to be more susceptible in nursery beds than J. scopulorum. Additional findings of this sort will cause a modification of our ideas concerning the apparent resistance of Rocky Mountain juniper nursery stock.

In Minnesota at one of the government tree-planting agencies located at Winona, cedar-blight injury had been appreciable in 1939 (4). The following year the disease was light and scattered (Letter from Mr. Young, September 23, 1940). Also, in the adjoining State of Wisconsin, a nursery near Milwaukee that had experienced heavy loss of eastern red cedar seedlings in 1939 (4) did not have as much difficulty in 1940 although the disease was still present, according to a letter of August 13, 1940, received from C. Audrey Richards, Division of Forest Pathology, Madison, Wisconsin. Specimens of diseased nursery stock of eastern red cedar collected elsewhere in that State at Wisconsin Rapids (October) and

at Racine (November) were sent the writer for diagnosis in 1940 by A. J. Riker, Department of Plant Pathology, University of Wisconsin. The former had been propagated from seed collected on native eastern red cedar growing in the Baraboo hills. Both collections were found infected with the cedar-blight parasite Phomopsis juniperovora. These Wisconsin findings are interesting because it is only recently that the disease has been reported in nurseries of that State despite the fact that it has been prevalent and destructive in nurseries in the nearby States of Minnesota, Iowa, and Illinois since the beginning of the twentieth century (3).

In 1940 we obtained so far as known the first authenticated record of Phomopsis juniperovora as a nursery problem in Oklahoma (3, pp. 54-55). A nursery in the eastern part of that State, that had grown eastern red cedars for only two years, lost practically an entire crop of 1-0 seedlings propagated in beds located about 700 feet from the site upon which introduced transplant red cedar stock from Kansas and Nebraska was grown the previous year (letter from A. Engstrom, Oklahoma Planning and Resources Board, Division of Forestry). Infected 1-0 seedlings from this nursery submitted to the writer through Mr. Wright showed the presence of P. juniperovora in great abundance. In addition to this record, the writer has just been informed in a letter of January 22, 1941 from S. A. Byars, Prairie States Forestry Project, Forest Service, that he had observed cedar blight for the first time at Chickasha, Oklahoma, during the autumn of 1940 on transplant red cedar stock introduced from Nebraska. Mr. Byars also stated that he had not observed the disease on wildling eastern red cedars in that State. The nursery reports from Oklahoma are exceedingly interesting for in this western State and also in Texas and in the Dakotas very little or nothing has been known concerning the occurrence of P. juniperovora (3, 4).

Cedar blight continues unreported as far as known from the Dakotas where both eastern red cedar and Rocky Mountain juniper (western red cedar) are propagated. In a letter dated September 30, 1940, to Mr. Wright, E. J. George, Division of Dry Land Agriculture, Bureau of Plant Industry, Mandan, North Dakota, stated that seedlings, transplants, and older trees of both species appeared free from the disease.

In 1940, a number of specimens of blighted cedars, including Arizona cypress (Cupressus arizonica Greene), were submitted by A. A. Dunlap, Division of Plant Pathology and Physiology, Texas Agricultural Experiment Station, to the writer for diagnosis as possible cedar blight. Phomopsis juniperovora was not present in any of this material, although another organism tentatively identified as Macrophoma cupressi (Cke. & Hark.) Berl. & Vogl. was found associated with a pronounced foliage blight.

Data concerning the occurrence of Phomopsis juniperovora in Texas are exceedingly meager. An attempt was made in 1940 to examine so far as known the only recorded specimens of the parasite in that State.

These were reported on Italian cypress (Cupressus sempervirens L.), and Juniperus spp. (Texas Agr. Exp. Sta., 1935, in PDR Suppl. 96:244, 247. Dec. 31, 1936). The writer has been informed that these specimens are no longer available. It is here interesting to note that in January 1928 the writer examined specimens of diseased Italian cypress taken at a nursery at Center Point, Texas, and submitted through L. W. R. Jackson, Division of Forest Pathology, Athens, Ga. Among other fungi present a Phomopsis was found, which appeared to be saprophytic, and which was determined as P. occulta Trav. [Diaporthe conorum (Desm.) Niessl] (2). This fungus, although closely related to P. juniperovora, is morphologically and culturally distinct from the latter. Care should be taken when diagnosing diseased Cupressaceous specimens, particularly wildling eastern red cedar, not to confuse P. occulta with the cedar-blight parasite.

So far as known to the writer there has been only a single case of authenticated cedar blight in Texas nurseries, a 1929 case hitherto unreported. It concerned a shipment of several lots of junipers, all of which according to a communication from the purchaser were diseased in the same manner. This stock was introduced from Illinois into a Texas nursery in Beaumont. Specimens of Chinese juniper seedlings (Juniperus chinensis L.) from this shipment were examined by the writer and Phomopsis juniperovora was identified.

Reports of cedar blight in nurseries in Virginia and in the southeastern part of the United States were obtained from W. C. Davis, Civilian Conservation Corps and U. S. Department of Agriculture, Bureau of Plant Industry (letter of March 10, 1941). He stated that in 1940 the disease at a Virginia nursery and at a North Carolina nursery was not as serious as in the two preceding years. At a second North Carolina nursery, cedar blight was not as destructive as in 1939. The blight during the 1940 growing season did not appear at these nurseries until late August or early September. According to Davis' observations at two of these nurseries on stand density and its relation to incidence of blight, relatively thin stands were a controlling factor in the disease. In 1940, as in previous years, he did not find cedar blight at two nurseries on the eastern coast of North Carolina. The same can be reported for South Carolina, a State from which so far as known there are no reports of Phomopsis juniperovora (3, p. 54). In the latter State, eastern red cedar is not grown commonly in large scale production, and likewise relatively thin stands have been maintained where red cedar is produced.

Literature Cited

1. Hahn, Glenn G., Carl Hartley, and R. G. Pierce. A nursery blight of cedars. Journ. Agr. Res. 10:533-540. 1917.

2. ----------. Life-history studies of the species of Phomopsis occurring on conifers. Part I. Trans. Brit. Mycol. Soc. 15:32-93. 1930.

3. ----------. Distribution and hosts of cedar blight in the United States. Plant Disease Reporter 24:52-57. 1940.

4. ----------. Reports of cedar blight in 1939. Plant Disease Reporter 24:57-58. 1940.

(Division of Forest Pathology, Bureau of Plant Industry, cooperating with the Osborn Botanical Laboratory, Yale University, New Haven, Connecticut.)

SOME PARASITIC AND SAPROBIC FUNGI OF SOUTHERN OHIO

William Bridge Cooke

The following list is of fungi occurring in southern Ohio, collected in the counties mentioned during the past 20 years. Many of the stem and leaf disease fungi were collected by a series of classes in phytopathology under the direction of Dr. O. T. Wilson. Many of the wood rotting and otherwise saprobic fungi were collected by a series of taxonomy classes under the direction of Dr. Margaret Fulford. The writer has added to the collections during the last 10 years. Materials of the listed species are on file in the Herbarium and Phytopathology Laboratory at the University of Cincinnati.

Assistance in determining a number of critical groups was had from the following authorities: Taphrina, Dr. A. J. Mix; Pyrenomycetes, Dr. L. E. Wehmeyer; Ustilaginales, Dr. G. L. Zundel: Phyllachora, Dr. C. R. Orton; Pestalotia, Dr. E. F. Guba; Discomycetes, Dr. B. B. Kanouse and Dr. F. J. Seaver; Tremellales, Dr. G. W. Martin; Polyporaceae, Dr. L. O. Overholts; Poria, Dr. D. V. Baxter; and Hyphomycetes, Dr. D. H. Linder. It is not to be assumed that all the species listed under these groups have been seen by these correspondents. Dr. Roderick Sprague has helped with the several grass diseases mentioned.

While over 1400 species of fungi have been reported from the southwestern section of Ohio, the present list is intended to be of a preliminary nature, listing species now on file in the local herbarium.

PHYCOMYCETES

Albugo candida (Pers. ex Lév.) O. Kuntze on Capsella bursa-pastoris (L.) Medic. - Hamilton Co.

Synchytrium asari Arth. & Holw. on Asarum canadense L. - Clermont Co.

ASCOMYCETES

Taphrinaceae

Taphrina deformans (B.) Tul. on Prunus persica (L.) Stokes [Amygdalus persica] - Hamilton, Pike Cos.

T. potentillae (Farl.) Johanss. on Potentilla canadensis L. Warren Co.
T. purpurascens (Ell. & Ev.) B. L. Robinson on Rhus copallina L. Clermont Co.
T. polystichii Mix on Polystichum acrostichoides (Michz.) Schott. Hamilton Co.
T. virginica Seymour & Sadebeck on Ostrya virginica (Mill.) K. Koch Hamilton Co.

Capnodiaceae

Scorias spongiosa (Schw.) Ell. & Ev. associated with aphids on branches of Fagus grandifolia Ehrh. [F. americana] - Hamilton, Highland Cos.

Phyllachoraceae

Phyllachora graminis (Pers.) Fckl. on Hystrix patula Moench. Hamilton Co.; on Elymus sp., - Warren Co.
P. luteo-maculata (Schw.) C. R. Orton on Andropogon furcatus Muhl.--Highland Co.
P. puncta (Schw.) C. R. Orton on Panicum latifolium, L. - Highland Co.
P. vulgata Theiss. & Syd. on Muhlenbergia sp. - Warren Co., on unidentified grass - Warren Co.
Plowrightia morbosa (Schw.) Sacc. [Dibotryon] on Prunus sp. - Clermont, Warren Cos.

Erysiphaceae

Erysiphe cichoracearum DC. on Ambrosia trifida L. - Hamilton Co.;
Aster laevis L. - Hamilton Co.;
Aster shortii Lindl. - Hamilton Co.;
Helianthus strumosus L. - Hamilton Co.;
Hydrophyllum macrophyllum Nutt. - Hamilton Co.;
Phlox divaricata L. - Hamilton Co.
Plantago sp. - Clermont Co.
Solidago canadensis L. - Hamilton Co.
Solidago latifolia L. - Hamilton Co.
Valeriana pauciflora Michx. - Clermont Co.

E. polygoni DC. on Polygonum aviculare L. - Clermont Co.
Microsphaera alni (Wallr.) Salm. on Quercus alba L. - Hamilton Co.; on Syringa vulgaris L. - Hamilton Co.
M. diffusa Cke. & Pk. on Symphoricarpos orbiculatus Moench. [S. vulgaris] - Hamilton Co.
M. grossulariae (Wallr.) Lév. on Sambucus canadensis L. - Hamilton Co.
Sphaerotheca humuli (DC.) Burr. var. fuliginea (Schl.) Sal. on Bidens sp. - Hamilton Co.
Uncinula aceris (DC.) Sacc. on Acer saccharum Marsh. - Hamilton Co.
U. necator (Schw.) Burr. on Vitis sp. - Hamilton Co.

ASCOMYCETES--Continued.

U. salicis (DC.) Wint. on Salix nigra Marsh. - Hamilton Co.

Chaetomiaceae

Chaetomium spirochaete Palliser. On filter paper. - Hamilton Co.

Sphaeriaceae

Acanthostigma atro-barbatum (Cke. & Ell.) Ell. & Ev. - Hamilton Co.
Lasiosphaeria ovina (Pers.) Ces. & DeNot. - Hamilton Co.
Rosellinia aquila (Fr.) DeNot. on rotten Quercus spp. - Clermont, Hamilton, Highland Cos.
R. subiculosa (Schw.) Sacc. - Clermont, Hamilton, Warren Cos.

Mycosphaerellaceae

Guignardia bidwellii (Ell.) Viala & Ravaz on Vitis sp., - Hamilton, Athens Cos.
Physalospora cydoniae Arnaud on Cydonia oblonga Mill. - Hamilton Co.
Pyrus malus L. [Malus sylvestris] - Hamilton Co.
Venturia inaequalis (Cke.) Aderh. on Pyrus malus L. - Hamilton Co.

Gnomoniaceae

Glomerella cingulata (Ston.) Spauld. & Schrenk on Capsicum annuum Hamilton Co.
Pyrus malus L. - Hamilton Co.
Prunus persica (L.) Stokes - Hamilton Co.
Gnomonia veneta (Sacc. & Speg.) Kleb. on Platanus occidentalis L. - Hamilton Co.

Diaporthaceae

Endothia parasitica (Murr.) And. & And. on Castanea dentata Rorkh. - Highland, Jackson, Ross Cos.
Eutypa spinosa (Pers.) Tul. on Quercus spp. - Clermont, Hamilton, Highland Cos.
Pseudovalsa subrufa Ell. & Ev. on Ailanthus glandulosa Desf. - Clermont Co.

Allantosphaeriaceae

Diatrype albopruinosa (Schw.) Cke. - Hamilton Co.
D. stigma (Hoffm.) DeNot. on Carya sp., etc. - Adams, Clermont, Hamilton, Highland Cos.
D. virescens (Schw.) Berk. on Fagus grandifolia Ehrh. - Clermont, Hamilton, Highland, Jackson Cos.

ASCOMYCETES--Continued

Eutypella cerviculata (Fr.) Sacc. - Hamilton Co.
E. ?deusta Ell. & Ev. - Clermont Co.
E. fraxinicola (Cke. & Pk.) Ell. & Ev. on Fraxinus spp. - Clermont, Hamilton, Warren Cos.
E. scoparia (Schw.) Pk. - Hamilton Co.

Xylariaceae

Daldinia concentrica (Bolt.) Ces. & DeNot. on Fagus sp., Ulmus sp., Quercus sp., etc. - Adams, Clermont, Hamilton, Highland, Warren Cos.
Hypoxylon annulatum (Schw.) Mont. - Clermont Co.
H. atropunctatum (Schw.) Cke. on Fagus sp., Carya sp., etc. - Clermont, Hamilton Cos.
H. coccineum Bull. on Fagus grandifolia Ehrh. - Clermont, Hamilton, Highland Cos.
H. cohaerens (Pers.) Fr. Hamilton Co.
H. fuscum (Pers.) Fr. - Clermont Co.
H. marginatum (Schw.) Ell. & Ev. - Hamilton Co.
H. rubiginosum (Pers.) Fr. on Quercus spp., etc. - Clermont, Hamilton, Highland, Jackson, Ross, Warren Cos.
H. semiimmersum Nit. - Highland Co.
Nummularia bulliardii Tul. on Fagus grandifolia Ehrh. - Clermont, Hamilton, Highland, Jackson Cos.
Ustulina vulgaris Tul. on Fagus grandifolia Ehrh., Quercus spp., etc. - Adams, Clermont, Hamilton, Highland, Jackson, Warren Cos.
Xylaria hypoxylon (L.) Grev. - Highland, Hamilton, Hocking Cos.
X. polymorpha (Pers.) Grev. - Adams, Brown, Clermont, Hamilton, Highland, Hocking, Ross, Warren Cos.

Hypocreaceae

Hypocrea brevipes Sacc., on Pyrus communis, Carpinus caroliniana - Clermont, Hamilton, Warren Cos.
H. citrina (Pers.) Fr. on Quercus sp. - Hamilton Co.
H. chromosperma Cke. & Pk. - Hamilton Co.
H. rufa (Pers.) Fr. - Hamilton Co.
H. sulphurea (Schw.) Sacc. on Prunus serotina, Fagus grandifolia Ehrh. Clermont, Hamilton, Highland Cos.

Phacidiaceae

Rhytisma acerinum (Pers.) Fr. on Acer rubrum L. - Clermont Co.

Patellariaceae

Tryblidiella rufula Spreng. on Maclura pomifera (Raf.) Schneider - Clermont, Greene, Hamilton Cos.

ASCOMYCETES--Continued

Mollisiaceae

Mollisia cinerea Batsch. - Hamilton, Highland, Ross, Warren Cos.
Pseudopeziza trifolii (Biv.) Fckl. on Trifolium pratense L. - Clermont Co.

Helotiaceae

Calycina macrospora (Pk.) Seaver - Clermont, Hocking Cos.
Chlorociboria aeruginosa (Oed.) Seaver - Hamilton, Highland, Jackson Cos.
C. versiformis (Pers.) Seaver - Hamilton, Highland Cos.
Chlorosplenium chlora (Schw.) Fr. - Hamilton Co.
Helotium citrinum Hedw. - Adams, Brown, Clermont, Hamilton, Highland, Hocking Cos.
H. fructigenum (Bull.) Fckl. - Highland Co.
H. serotinum (Pers.) Rehm - Clermont, Hamilton, Highland Cos.
Lachnum bicolor (Bull.) Gill. - Clermont, Hamilton, Highland, Hocking Cos.
Phialea cyathoidea (Bull.) Gill. on Gleditsia triacanthos L. pods - Hamilton Co.
Sclerotinia fructicola (Wint.) Rehm on Prunus persica (L.) Stokes - Hamilton Co.

Bulgariaceae

Coryne sarcoides (Jacq.) Tul. var. urnalis (Nyl.) Rehm - Hamilton Co.

Geoglossaceae

Leotia lubrica (Scop.) Pers. - Clermont, Hamilton, Hocking Cos.
Mitrula phalloides (Bull.) Chev. - Hocking Co.
Trichoglossum hirsutum (Pers.) Boud. - Highland Co.

Pezizaceae

Bulgaria rufa Schw. - Hamilton, Hicking, Warren Cos.
Ascobolus striisporus (Ell. & Dearn.) Seaver - Highland Co.
Pseudoplectania nigrella (Pers.) Fckl. - Adams, Jackson Cos.

BASIDIOMYCETES

Pucciniales - Melampsoraceae

Coleosporium campanulae (Pers.) Lév. on Campanula americana L. - Hamilton Co.
C. senecionis (Pers.) Fr. on Pinus nigra Arn. var. austriaca Schn. [P. nigra] - Hamilton Co.; on Solidago canadensis L. - Hamilton Co.
Cronartium quercuum (Berk.) Miyabe on Pinus virginiana Mill. - Jackson, Pike Cos.

BASIDIOMYCETES--Continued

Melampsora bigelowii Thüm. on Salix nigra Marsh. - Clermont Co.
M. medusae Thüm. on Populus deltoides Marsh. - Clermont Co.

Pucciniales - Pucciniaceae

Gymnoconia peckiana (Howe) Trotter on Rubus villosus Ait. - Clermont Co.
Gymnosporangium clavipes Cke. & Pk. on Juniperus virginiana L. - Warren Co.
Gymnosporangium globosum Farl. on Juniperus virginiana L. - Hamilton, Ross Cos.; on Crataegus sp. - Clermont Co.; on Pyrus coronaria L. [Malus coronaria] - Hamilton Co.
G. juniperi-virginianae Schum. on Juniperus virginiana L. - Clermont Co.; Pyrus malus D. - Hamilton Co.
Phragmidium americanum (Pk.) Diet. on Rosa sp. - Clermont Co.
Puccinia angustata Peck. on Lycopus sp. - Clermont Co.
P. Antirrhini Diet. & Holw. on Antirrhinum majus L. - Hamilton Co.
P. asparagi DC. on Asparagus officinalis L. - Hamilton Co.
P. convolvuli (Pers.) Cast. on Convolvulus sp. - Hamilton Co.
P. eatonii Arth. on Ranunculus sp. - Hamilton Co.
P. graminis Pers. on Poa compressa L. - Warren Co.; Poa pratensis L. - Hamilton Co.; Triticum aestivum L. - Hamilton Co.
P. graminis var. phlei-pratensis (Erikss. & Henn.) Stak. & Piem.; on Phleum pratense L. - Hamilton Co.
P. helianthi Schw. on Helianthus annuus L. - Hamilton Co.
P. hieracii (Schum.) Mart. on Taraxacum officinale Weber - Hamilton Co.
P. malvacearum Bert. on Malva sp. - Hamilton Co.
P. mariae-wilsonii G. W. Clinton on Claytonia virginica L. - Hamilton Co.
P. pimpinellae (Str.) Mart. on Osmorhiza longistylis (Torr.) DC. - Clermont Co.
P. rubigo-vera (DC.) Wint. on Triticum aestivum L. - Warren Co.
P. rubigo-vera var. impatientis (Arth.) Mains on Impatiens sp. Hamilton Co.
P. ruelliae (Berk. & Br.) Lagerh. on Ruellia strepens L. - Hamilton Co.
P. schedonnardii Kellerm. & Sw. on Muhlenbergia mexicana (L.) Trin.--Warren Co.
P. smilacis Schw. on Smilax bona-nox L. - Highland, Jackson Cos.
P. sorghi Schw. on Zea mays L. - Clermont Co.
Puccinia vernoniae Schw. on Vernonia fasciculata Michx. - Clermont Co.
P. windsoriae Schw. on Triodia flava (L.) Hitchc. - Warren Co.
P. xanthii Schw. on Xanthium sp. - Hamilton Co.
Tranzschelia pruni-spinosae (Pers.) Diet. on Hepatica acutiloba DC.- Highland Co.
Uromyces andropogonis Tracy on Andropogon virginicus L. - Warren Co.
U. asclepiadis (Schw.) Cke. on Asclepias syriaca L. - Clermont Co.
U. caladii (Schw.) Farl. on Arisaema dracontium (L.) Schott. and A. triphyllum (L.) Schott. - Hamilton

BASIDIOMYCETES--Continued

U. hedysaryi-paniculata (Schw.) Farl. on Desmodium sp. - Clermont, Warren Cos.
U. phaseoli (Pers.) Wint. on Phaseolus sp. - Hamilton Co.
U. polygoni (Pers.) Fckl. on Polygonum acre HBK. - Clermont Co.
U. trifolii (Hedw.) Lév. on Trifolium pratense L. - Clermont Co.

Ustilaginales

Sorosporium ellisii Wint. on Andropogon virginicus L. - Highland, Warren Cos.
Tilletia tritici (Bjerk.) Wint. on Triticum aestivum L. - Hamilton Co.
Urocystis anemones (Pers.) Schroet. on Hepatica acutiloba DC. - Highland Co.
Ustilago rabenhorstiana Kühn. on Digitaria sanguinalis (L.) Scop. - Warren Co.
U. striaeformis (Westend.) Niessl on Andropogon virginicus L. -
U. utriculosa (Nees) Tul. on Polygonum acre HBK. - Hamilton Co.
U. zeae (Beck.) Unger. on Zea mays L. - Hamilton Co.

Tremellales - Dacrymycetaceae

Calocera cornea Fr., - Adams, Hamilton, Highland Cos.
Dacrymyces deliquescens Fr. - Hamilton, Jackson Cos.
D. ellisii Coker - Jackson Co.
D. fuscominus Coker on Betula sp. - Jackson Co.
D. palmatus (Schw.) Bres. on Vitis sp., Quercus spp., etc. - Greene, Hamilton, Ross, Warren Cos.
Dacryomitra stipitata (Pk.) Burt - Hamilton Co.
Femsjonia luteo-alba Fr. on Quercus sp. - Hamilton Co.
Guepinia elegans B. & C. on Ulmus sp., Platanus occidentalis - Clermont, Hamilton Cos.
G. spathularia Fr. - Adams, Clermont, Clinton, Hamilton, Highland, Jackson Cos.

Tremellaceae

Exidia glandulosa Fr. on Fagus grandifolia Ehrh. - Brown, Clermont, Greene, Hamilton, Highland, Jackson, Warren Cos.
E. nucleata (Schw.) Burt - Clermont, Greene, Hamilton, Warren Cos.
E. recisa Fr. - Clermont, Hamilton, Highland, Jackson, Ross, Warren Cos.
Seismosarca alba Lloyd - Adams, Clermont, Hamilton, Highland Cos.
Tremella frondosa Fr. on Fagus grandifolia and Carya sp. - Clermont, Hamilton, Ross Cos.
T. mesenterica Retz ex Fr. - Jackson Co.
T. tuberculariа Berk., - Jackson Co.
Tremellodendron candidum (Schw.) Atk. - Brown, Clermont, Clinton, Hamilton, Highland Cos.
T. cladonia (Schw.) Burt - Hocking Co.

BASIDIOMYCETES--Continued

Tremellodon gelatinosum (Scop. ex Fries) Pers. on Tsuga canadensis - Hocking Co.

Auriculariaceae

Auricularia auricula-judae (Fr.) Schroet. - Adams, Clermont, Clinton, Greene, Hamilton, Highland, Hocking Cos.
Phleogena faginea (Fr.) Link on Carpinus caroliniana - Hamilton Co.
Septobasidium curtisii (B. & Desm.) Boed. & Stein. on Gleditsia triacanthos - Hamilton Co.

Agaricales

Polyporaceae

Daedalea ambigua Berk. on Fagus grandifolia, etc. - Brown, Clermont, Hamilton, Highland, Warren Cos.
D. confragosa (Bolt.) Fr. on Salix spp., Carpinus caroliniana, Cornus sp., Crataegus sp., Pyrus malus, etc. - Athens, Brown, Clermont, Hamilton, Highland, Jackson, Ross, Warren Cos.
D. unicolor (Bull.) Fr. on Fagus grandifolia, etc. - Adams, Clermont, Clinton, Hamilton, Hocking, Ross, Scioto, Warren Cos.
Favolus canadensis Kl. on Carya spp., etc. - Adams, Brown, Clermont, Hamilton, Highland, Jackson, Ross Cos.
Fistulina hepatica (Huds.) Fr. on Fagus grandifolia, Quercus spp. - Highland, Ross Cos.
Fomes applanatus (Pers.) Wallr. on Quercus spp., etc. - Brown, Champaign, Clermont, Greene, Hamilton, Highland, Jackson Cos.
F. conchatus (Pers.) Fr. on Crataegus spp. - Clermont, Hamilton, Highland Cos.
F. connatus (Sw.) Cke. on Quercus alba, Fagus grandifolia, Acer sp. - Brown, Clermont, Hamilton, Warren Cos.
F. densus Lloyd on Quercus sp. - Hamilton Co.
F. fraxinophilus Berk. on avenue and forest trees of Fraxinus americana - Clermont, Hamilton, Highland, Ross Cos.
F. igniarius (L.) Kickx on Pyrus malus - Hamilton, Highland Cos.
F. igniarius var. laevigatus (Fr.) Overh. on Carya sp. - Hamilton Co.
F. lobatus (Schw.) Cke. on Acer sp., Quercus sp., etc. - Clermont, Greene, Hamilton, Highland, Jackson, Ross Cos.
F. ohiensis Berk. on Robinia pseudo-acacia, Gleditsia triacanthos, Quercus sp., Maclura pomifera, etc. - Adams, Clermont, Greene, Hamilton, Highland, Ross Cos.
F. pini (Brot. ex Fr.) Karst. on Pinus virginiana - Jackson Co.
F. rimosus Berk. on living Robinia pseudo-acacia - Clermont, Hamilton, Ross Cos.
F. robustus Karst. on Quercus spp. - Hamilton, Hocking Cos.
F. scutellatus (Schw.) Cke. on Quercus sp. - Hocking Co.
Hydnochaete olivaceum (Schw.) Banker on Quercus spp., - Clermont, Hamilton, Highland Cos.
Irpex farinaceus Fr. on Ulmus sp. - Hamilton, Highland Cos.

BASIDIOMYCETES--Continued

Lenzites betulina L. ex Fr. on Fagus grandifolia, Quercus spp., etc. - Brown, Butler, Clermont, Hamilton, Highland, Jackson, Ross, Scioto Cos.

L. saepiaria Wulf. ex Fr. on Pinus virginiana, fence rails, railroad ties, etc. - Clinton, Hamilton, Highland, Hocking, Jackson, Warren Cos.

Merulius corium Fr. on Quercus spp., etc. - Clermont, Hamilton, Highland Cos.

M. tremellosus Schrad. ex Fr. on Fagus grandifolia, Quercus spp., etc. - Clermont, Hamilton, Highland Cos.

Phlebia merismoides Fr. on Quercus spp. - Hamilton Co.

P. radiata Fr. on Fagus grandifolia, Quercus spp. - Brown, Clermont, Hamilton, Highland Cos.

Polyporus abietinus Dicks. ex Fr. on Pinus virginiana - Jackson Co.

P. adustus Willd. ex Fr. on Fagus grandifolia, Quercus spp., etc. - Adams, Clermont, Greene, Hamilton, Highland, Jackson, Ross, Sciotto, Warren Cos.

P. arcularius Kl. on Fagus grandifolia, Quercus spp., etc. - Brown Clermont, Greene, Hamilton, Highland, Jackson, Warren Cos.

P. biformis Kl. on Fagus grandifolia - Clermont, Hamilton Cos.

P. brumalis Fr. on Quercus spp., etc. - Hamilton, Jackson, Warren Cos.

P. caesius Fr. on Quercus spp., etc. - Clermont, Jackson, Hamilton Cos.

P. cinnabarinus Jacq. ex Fr. on Fagus grandifolia, Prunus serotina, etc. - Adams, Clermont, Hamilton, Highland, Hocking, Jackson, Ross, Warren Cos.

P. conchifer Schw. on Ulmus americana - Butler, Clermont, Clinton, Hamilton, Jackson Cos.

P. cristatus Pers. ex Fr. - Hocking Co.

P. cuticularis Bull. ex Fr. on Fagus grandifolia - Clinton, Hamilton, Highland Cos.

P. delectans Pk. on Quercus spp., etc. - Clermont, Hamilton Cos.

P. dependens Berk. on Quercus sp. - Highland Co.

P. dichrous Fr. on Fagus grandifolia, Quercus spp., etc. - Adams, Clermont, Hamilton, Warren Cos.

P. distortus Schw. - Clermont Co.

P. dryophilus Berk. on Quercus velutina - Hamilton Co.

P. frondosus Fr. on Quercus spp. - Hamilton, Highland, Warren Cos.

P. fumosus Pers. ex Fr. on Quercus spp., etc. - Clermont, Clinton, Hamilton, Highland Cos.

P. galactinus Berk. on Quercus spp., etc. - Clermont, Clinton, Highland Cos.

P. gilvus Schw. on Carpinus caroliniana, Quercus spp., Cornus sp., Gleditsia triacanthos, etc. - Adams, Clermont, Greene, Hamilton, Highland, Ross Cos.

P. graveolens Berk. on Fagus grandifolia - Hamilton, Highland Cos.

P. hirsutus Wulf. ex Fr. on Fagus grandifolia, etc. - Adams, Clermont, Hamilton, Highland, Hocking, Jackson, Scioto Cos.

P. pargamenus Fr. on Prunus serotina, Fagus grandifolia, etc. - Adams, Clermont, Hamilton, Highland, Jackson, Ross Cos.
P. perennis Fr. - Clermont, Hamilton, Highland Cos.
P. pocula Schw. on Castanea dentata and Quercus sp. - Adams, Hocking, Scioto Cos.
P. pubescens Schum. ex Fr. on Fagus grandifolia, etc. - Clermont, Hamilton, Highland Cos.
P. radicatus Schw. - Clermont, Hamilton, Highland Cos.
P. resinosus Schrad. ex Fr. on Fagus grandifolia, Quercus spp., etc. - Clermont, Hamilton, Highland Cos.
P. robiniophilus (Murr.) Lloyd on Robinia pseudo-acacia, etc. - Clermont, Hamilton, Highland Cos.
P. sulphureus Bull. ex Fr. on Quercus spp., etc. - Adams, Brown, Clermont, Hamilton, Highland Cos.
P. tephroleucus Fr. on Quercus spp., Fagus grandifolia, etc. - Clermont, Hamilton Cos.
P. tulipiferae (Schw.) Overh. on Quercus spp., Fagus grandifolia, Prunus serotina, Ulmus americana, etc. - Adams, Clermont, Greene, Hamilton, Highland, Jackson Cos.
P. versicolor L. ex Fr. on Ginkgo biloba and most hardwoods in our area - Adams, Brown, Clermont, Greene, Hamilton, Highland, Jackson, Ross, Warren Cos.
Ganoderma lucida (Fr.) Karst. on Acer saccharinum, etc. - Brown, Clermont, Clinton, Hamilton, Scioto Cos.
G. tsugae Murrill on Tsuga canadensis - Hocking, Jackson Cos.
Poria ambigua Bres. - Clermont, Hamilton, Highland, Jackson Cos.
P. euporia Karst. - Clermont Co.
P. ferruginosa Schrad ex Fr. - Hamilton Co.
P. medulla-panis Fr. - Hamilton Co.
P. mollusca (Fr.) Quel. - Highland Co.
P. nigrescens Bres. - Clermont Co.
P. omoema Berk. - Clermont, Hamilton Cos.
P. punctata Fr. - Clermont, Hamilton Cos.
P. semitincta Pk. - Hamilton Co.
P. spissa (Schw.) Cke. on Pyrus malus, etc. - Hamilton, Warren Cos.
P. undata (Pers.) Bres. - Hamilton Co.
P. versipora Pers. - Hamilton Co.
Trametes hispida Bagl. - Preble Co.
T. malicola Berk. - Clermont, Hamilton Cos.
T. mollis (Sommerf.) Fr. - Highland Co.
T. sepium Berk. - Hamilton Co.

FUNGI IMPERFECTI

Bactridium flavum K. & S. - Hamilton, Highland Cos.
?Botrytis isabellina Preuss. - Warren Co.
Chromosporium fulvum (Berk. & Curt.) Sacc. - Hamilton Co.
Coccospora aurantiaca Wallr. - Hamilton Co.
Diplocladium majus Bon. on Collybia velutipes and old leaves - Clermont, Highland Cos.

FUNGI IMPERFECTI--Continued

Fusidium caesium Schw. on old chestnut burr - Highland Co.
Haplaria grisea Lk. - Hamilton Co.
Helminthosporium siccans Drechsl. on Triticum aestivum - Warren Co.
Lolium perenne L. - Warren Co.
Heterosporium ornithogallii (Klotzsch) Cooke on Ornithogallum umbellatum L. - Warren Co.
Monilia ochracea Povah - Highland Co.
M. sitophila (Mont.) Sacc. on Acer saccharinum - Highland Co.
Pestalotia versicolor Speg. var. junci Ell. & Langl. on Marica gracilis - U. C. Greenhouse, Hamilton Co.
Rhinotrichum curtisii Berk. - Hamilton Co.
Sporodesmium concinnum Berk. - Hamilton Co.
Sporotrichum chrysospermum Merz. - old Fomes sp. - Hamilton Co.
Streptothrix abietina Peck on Juniperus virginiana - Adams Co.

Note: In cases where no host is given for the fungus listed the fungus either grows on the ground, in humus, or on wood which has rotted beyond our recognition. In all such latter cases the wood is of deciduous species. In former cases, in central Ohio counties, the ground or humus may be under coniferous trees.

It might be of interest to note that in Hamilton, Clermont, Warren, Clinton, and Greene Counties the collection locations are largely in the Little Miami Valley. In Highland County only one location, The Seven Caves, a private park, has been visited. The Hocking County locations are to be found in the several State Parks in the Scioto River drainage.

ON THE LONGEVITY OF THE CROWN GALL ORGANISM IN SOIL

E. M. Hildebrand

The recent note in the Reporter (Cochran, 4,) to the effect that the crown gall organism (Phytomonas tumefaciens) can persist in grain land for 40 years in the total absence of susceptible plants seems deserving of comment since no investigator, to the writer's knowledge, has hitherto reported longevity of this organism experimentally for over two years in soil.

Based on isolation experiments some of the maximum survival periods for the crown-gall organism reported in the literature during the past 20 years in various types of sterilized and unsterilized soil are: Riker (10, 1922), about 1 year; Reddick and Stewart (9, 1924), 186 days; Muncie (6, 1926), 154 days; Patel (7, 1928), 424 days; Banfield,(1, 1928), about 1 year; Patel (8, 1929), 736 days; Banfield (2, 1934), 14 months. The writer has unpublished data from an experiment in Kansas of the crown-gall organism surviving in field soil for two years. In this

particular case peach pits were planted in a field from which grapes and raspberries had been removed two years previously with resulting serious damage from crown gall (approximately 60 percent infection). The crown gall bacteria were readily demonstrated in the soil by isolation experiments and the nurseryman admitted that in this instance he had departed from the customary practice of growing non-susceptible plants for at least three years between crops of susceptible plants.

The most common mode of dissemination of the crown gall organism from place to place probably is on contaminated plants or plant parts, a fact which has been demonstrated by numerous investigators including Banfield (2, 3,). The hairy root organism is similarly disseminated (Hildebrand, 5). This possibility was not excluded in the unusual case under consideration. Presence of crown gall bacteria in soil in numbers sufficient to bring about 95 to 100 percent infection of all the trees, should be readily demonstrated by isolation experiments, although it must be admitted that great difficulty has been experienced in demonstrating the presence of extremely small numbers of this organism and related species in soil even with the use of selective media.

Literature Cited

1. Banfield, W. M. Studies on the life history of the crown gall organism. Abst. in Phytopath. 18:128-129. 1928.

2. ---------- Life history of the crown-gall organism in relation to its pathogenesis on the red raspberry. Journ. Agr. Res. 48: 761-787. 1934.

3. ---------- and Mandenberg, E. C. Importance of sanitation in controlling crown gall of the red raspberry. (Abst.) Phytopath. 25:5-6. 1935.

4. Cochran, L. C. A case of the crown gall organism persistent in grain land. Pl. Dis. Reptr. 25(2):73. 1941.

5. Hildebrand, E. M. Life history of the hairy root organism in relation to its pathogenesis on nursery apple trees. Journ. Agr. Res. 48: 857-885. 1934.

6. Muncie, J. H. A study of crown gall caused by Ps. tumefaciens on rosaceous hosts. Iowa State Col. Journ. Sci. 1:67-117. 1926.

7. Patel, M. K. A study of pathogenic and non-pathogenic strains of Ps. tumefaciens Sm. & Town. Phytopath. 18:331-343. 1928.

8. Patel, M. K. Viability of certain plant pathogens in soils. Phytopath. 19:295-300. 1929.

9. Reddick, Donald and Stewart, V. B. Crown gall of apple and peach with notes on the biology of Bacterium tumefaciens. N. Y. (Cornell) Agr. Exp. Sta. Mem. 63. 1924. 19 pp.

10. Riker, A. J. Studies of crown gall. Phytopath. 12:55-56. 1922 (Abst.)

BRIEF NOTES ON PLANT DISEASES

PERSISTENCE OF PHYTOMONAS LAPSA ON SEED OF FIELD CORN: In 1939 the writer reported (Phytopathology 30(1): 1. 1940) the occurrence in 1937 of an epidemic of bacterial stalk rot, caused by Phytomonas lapsa, in certain corn-growing sections in California. At that time, a large sample of corn seed was obtained from a field in which the incidence of disease was approximately 90 percent. The seed was stored in a paper bag in a table drawer in the laboratory. Recently the seed was tested for viability in connection with certain other experiments. The seed gave 90 percent germination, but 20 percent of the plants developed bacterial stalk rot when grown in sterilized greenhouse soil. The causal organism was recovered and produced the disease when inoculated into healthy sweet-corn plants. Dusting the 4-year-old contaminated seed with New Improved Semesan Jr. prevented the disease. This pathogen shows a remarkable ability to withstand prolonged desiccation. Therefore, seed corn suspected of having bacterial stalk rot disease should be treated with a suitable disinfectant, even if it has been stored for several years. (P. A. Ark, Division of Plant Pathology, University of California, Berkeley, California.)

GARLIC RUST INFECTS ONION: Urédospores of garlic rust (Puccinia porri (Sow.) Wint.) from fields where circumstantial evidence (Gardner, PDR 24, 298-299, 1940) indicated that onions might not be susceptible, were used to inoculate garlic, Australian Brown and Italian Red onions, and asparagus. Heavy infection occurred on garlic and onion, but the pustules were smaller and less numerous on onion than on garlic. No infection occurred on asparagus. (C. E. Yarwood and M. W. Gardner. University of California.)

BOTRYTIS STEM-ROT OF TOMATO IN A GREENHOUSE IN MARYLAND: Tomato plants exhibiting symptoms of botrytis stem-rot were collected by Dr. H. L. Stier of the Department of Horticulture of the University of Maryland in a greenhouse on the Eastern Shore of Maryland. Stem cankers apparently originating at the old leaf scars had spread to involved adjacent tissues and in some cases had almost girdled the stems. Hyphae and spores of a species of Botrytis were abundant on these stem lesions. Isolation from the diseased tissues yielded a pure culture of Botrytis sp. (cinerea type). The diseased plants had been grown under humid and generally unfavorable conditions. This is believed to be the first report of the occurrence of this disease in Maryland. (Carroll E. Cox, Assistant in Plant Pathology, Maryland Agricultural Experiment Station, April 5, 1941.)

WHITE RUST ON TEXAS-GROWN SPINACH: White rust (Albugo occidentalis Wilson) of Texas-grown spinach, variety Long Standing Bloomsdale, was observed on the Elba, New York, market March 18. About 25 percent of the plants were affected slightly to severely. (E. L. Felix, March 27.)

DOWNY MILDEW ON TOBACCO IN GEORGIA AND SOUTH CAROLINA: Following the appearance of blue mold [=downy mildew, Peronospora tabacina] in early February in Georgia, the attack remained confined to old plant beds for some weeks. The disease reached a peak in these beds about March 1 and in some instances more than 90 percent of the plants were killed. Spread from old to new beds in the Georgia area was slow and infection did not become general throughout the area until about March 20. The behavior of the disease following this secondary spread was unusual in that the disease remained active in many beds for a period of a month or more. Peak disease development in the main Georgia belt occurred quite generally during the first week in April which is 2 to 3 weeks later than usual for this region. Tobacco plant beds in Georgia began the season with poor stands owing to dry weather, and it is estimated that blue mold, on the average, reduced stands further by about 35 percent. Owing to the excessive bed areas now planted in this area, even with the initial poor stand and the subsequent reduction due to the disease there will undoubtedly be an adequate plant supply, but for many growers plants will not be available until very late. Blue mold has been a major factor in causing this delay, which it is estimated will be at least 3 weeks for the Georgia area as a whole. It was noticeable that where beds had been watered to obtain a stand and blue mold control measures had been used later, plants were ready for setting out almost at the normal time.

In South Carolina on April 9 the first blue mold was observed in an old plant bed near Marion. Since then the disease has been reported in other old plant beds throughout the South Carolina belt, but no reports have yet been received of infection in the new plant beds. The plants in the South Carolina belt are much behind normal because of cold weather and this fact plus the uncertainty with regard to blue mold makes it doubtful as to when transplanting can be done in this area. Normally transplanting occurs between April 1 and 15. (J. G. Gaines and T. W. Graham, Division of Tobacco and Plant Nutrition.)

MATURITY OF THE APPLE SCAB FUNGUS IN PENNSYLVANIA: To date we have made collections of scabby leaves and examined perithecia of Venturia inaequalis from about 20 counties in Pennsylvania. About 5 percent of the perithecia have some colored spores and it is estimated that a few mature spores will start shooting in some orchards in southeastern Pennsylvania from now on. As in the past, scab spores are much more mature in unsprayed orchards than in sprayed orchards. (R. S. Kirby, Extension Plant Pathologist, Pennsylvania State College, April 2.)

Freeman Weiss

FAGUS (FAGACEAE)

FAGUS GRANDIFOLIA Ehrh., American beech. Forest tree of Growth Regions 20, 22, 23, 24, 25, 26, 27, 28, 29, 30; also cult.

Anthostoma turgidum (Pers. ex Fr.) Nit., on branches. Md., N. Y.
Armillaria mellea Vahl ex Fr., root rot. Occasional.
Asterosporium hoffmanni Kze., on branches. ?canker: New England to Mich. and Md. (Conidial stage of Botryosphaeria hoffmanni Höhn.)
Ceratostomella echinella Ell. & Ev., wood stain. Texas. C. microspora Ell. & Ev., on wood. N. Y.
Coccomyces comitialis (Batsch. ex Fr.) Dearn. & House on fallen leaves N. Y.
Coniothyrium fagi Tehon, on leaves. Ill.
Cryptodiaporthe galericulata (Tul.) Weh., on branches. Mich. N. Y.
Cryptosporella compta (Tul.) Sacc., on branches. W. Va.
Cytospora sp., also C. decorticans Sacc. and C. pustulata Sacc. & Roum., on branches, ?dieback and canker. N. J., Vt.
Daedalea confragosa Bolt. ex Fr., wood rot. N. Y., N. C.; D. quercina L. ex Fr., Conn; D. unicolor Bull. ex Fr., Md., Ind., Vt.
Daldinia concentrica (Bolt.) Ces. & De Not. and D. vernicosa (Schw.) Ces. & De Not., wood rot. Cosmopolitan.
Diaporthe fagi Weh., on branches. Mich., N. Y.; var. longispora Weh.; Mich.
Diatrype exasperans Gerard, on bark. N. Y. D. virescens (Schw.) Cke., on branches. Widespread.
Endothia gyrosa (Schw.) Fr., on bark, parasitic on roots. Va. to Ind. and southward. E. parasitica (Murr.) P. and H. And., on dead branches. N. C.
Epifagus virginiana (L.) Bart. (Orobanchaceae), beech-drops, cancer-root. Widespread.
Favolus alveolaris (DC.) Quél. on wood. Widespread.
Fomes applanatus (Pers. ex Fr.) Gill., butt rot, white mottled heart rot. New England to West Va.
F. connatus (Weinm. ex Fr.) Gill., white spongy rot. New England.
F. everhartii (Ell. & Gall.) Schrenk, white flaky heart rot. N. J. N. Y.
F. fomentarius (L. ex Fr.) Kickx., yellowish sapwood rot. New England to Pa.
F. fraxinophilus (Pk.) Sacc., white mottled heart rot. Conn.
F. igniarius (L. ex Fr.) Kickx., white spongy heart rot. New England, N. Y.; var. laevigatus (Fr.) Overh., Lower Mississippi Valley.
F. pinicola (Sw. ex Fr.) Cke., brown crumbly heart rot N. Y., Vt.
Fusicoccum guttulatum Sacc. & Roum., on twigs. N. H.
Gloeosporium fagi (Desm. & Rob.) Westend., leaf spot. Conn. to Wis. (Sometimes distinguished as var. americanum Ell. & Ev.; also G. fagicolum Pass.)
Graphium album (Cda.) Sacc., wood stain. Ark.
Hydnum septentrionale Fr. (and Hydnum spp.), white sapwood rot. New England to Ind.
Hymenochaete spp. (H. rubiginosa (Schrad. ex Fr.) Lév., H. tabacina (Sow. ex Fr.) Lév. and others); on wood. Widespread.

FAGUS--Continued

Hypoxylon spp. (H. atropunctata (Schw.) Cke., H. coccineum Bull. ex Fr., H. cohaerens Pers. ex Fr. and others), on wood. Widespread.
Lasiosphaeria pezizula (Berk. & Curt.) Sacc., wood stain. Southern States.
Lenzites betulina L. ex Fr., wood rot. Widespread.
Microsphaera alni DC ex Wint., powdery mildew. New England to Ill. and Gulf States. M. erineophila Pk., occurring on erinea (q. v.) or in association with mites on beech foliage, is regarded as distinct by some authorities.
Mycosphaerella fagi (Auer.) Lindau on leaves. Me. M. punctiformis (Pers. ex Fr.) Schroet., on fallen leaves. Mass., N. Y.
Nectria cinnabarina Tode ex Fr., on branches. Eastern States.
N. coccinea Pers. ex Fr., canker, New England, N. Y. Associated with the wooly beech scale, Cryptococcus fagi Baer., it causes the destructive bark disease of American, but not of European, beech in northern New England and eastern Canada. N. galligena Bres. also is reported in Me.
Panus stipticus Bull., wood rot. Ind.
Peniophora spp., wood rot. Widespread.
Phlebia cinnabarina Schw., wood rot. Vt.
Phomopsis sp., on twigs. Mich., N. Y.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Southern States.
Phyllactinia corylea Pers. ex Karst., powdery mildew. General.
Phyllosticta faginea Pk., leaf spot. Mass. to W. Va. and Wis.
Phytophthora cactorum (Leb. & Cohn) Schroet., bleeding canker. Mass., N. Y., R. I.
Polyporus spp. including especially P. adustus Willd. ex Fr., P. biformis Klotzsch, P. cinnabarinus Jacq. ex Fr., P. fagicola Murr. P. gilvus (Schw.) Fr., P. hirsutus Wulf ex Fr., P. obtusus Berk., P. pargamenus Fr., P. pubescens Fr., P. radiatus Sow. ex Fr., P. resinosus Schrad. ex Fr., P. squamosus Huds. ex Fr., P. spumeus Sow. ex Fr., P. tulipiferus (Schw.) Overh., P. versicolor L. ex Fr., and others; on dead trees and wood, sometimes on living trees. Widespread.
P. glomeratus Pk., canker, heart rot. New England.
Poria pulchella (Schw.) Cke., P. purpurea (Fr.) Cke., and Poria spp., on dead trees and wood. Widespread.
Schizophyllum commune Fr., wood rot. Cosmopolitan.
Scorias spongiosa (Schw.) Fr., on aphid secretions causing black masses on leaves and twigs. Widespread.
Septobasidium castaneum Burt. and S. cokeri Couch, feltfungus. Fla., Miss., N. C.
Stereum spp., especially S. bicolor Pers. ex Fr., S. fasciatum Schw., S. hirsutum Willd. ex Fr., and S. purpureum Pers. ex Fr., wood rot. Widespread.
Strumella coryneoidea Sacc. & Wint., canker. New England.
Ustulina vulgaris Tul., canker, sapwood rot. New England.
Valsa spp. (V. ambiens Pers. ex Fr., V. fagicola Ell. and others), on branches. New England to Pa.,

FAGUS--Continued

Valsaria exasperans (Gerard) Sacc., on branches. Ind., Va.
Erineum, -- leaf malformation caused by mites, Eriophyes sp. Me. to S. C. and La.
Leaf scorch, -- physiogenic, water deficit and heat. Frequent in cult. trees.
Mottle leaf, -- cause unknown, ?virus. Pa.

FAGUS spp. Chiefly vars. of F. sylvatica L., European beech, cult. in Zone IV and southward, and some oriental spp. cult. in Zone V.

Asterosporium hoffmanni Kze., on twigs, ?canker. Mass., N. J. (Conidial stage of Botryosphaeria hoffmanni Höhn.)
Cryptodiaporthe galericulata (Tul.) Weh., on branches. N. Y.
Cytospora sp., on twigs, ?canker. N. J.
Endothia gyrosa (Schw.) Fr., on bark, especially of roots. Md.
Fomes fomentarius (L. ex Fr.) Kickx, yellowish sapwood rot. Widespread.
Nectria cinnabarina Tode ex Fr., twig blight and canker (following winter injury). New England.
Phytophthora cactorum (Leb. & Cohn) Schroet., collar rot, bleeding canker. Southern New England, N. Y.
Phomopsis sp., on branches. Pa.
Stereum gansapatum Fr., wood rot. Ohio.

FEIJOWA (MYRTACEAE)

Feijowa sellowiana Berg, S. American ornamental and fruit-bearing shrub, cult. in Calif. and Fla.

Botrytis cinerea Pers., fruit rot. Calif.
Colletotrichum gloeosporioides Penz., fruit rot. Calif.
Penicillium expansum Lk. ex Thom, fruit rot. Calif.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

FENDLERA (SAXIFRAGACEAE)

FENDLERA spp. Dryland shrubs of southwestern U. S.

Gymnosporangium speciosum Pk. (G. gracilens Kern & Bethel), rust (O, I). Colo. and Utah to N. Mex. and Ariz. II and III on Juniperus spp.
Teichospora fendlerae (Earle) Sacc. & D. Sacc., on twigs. Colo.

FERONIA (RUTACEAE)

FERONIA LIMONIA Swingle, WOOD-APPLE. Small tree of SE. Asia cult. for fruit and as ornamental in Fla.

Phytomonas citri (Hasse) Bergey, canker. Fla. (Also reported on the related Feroniella lucida Swingle in Fla.) Subsequently eradicated.

FICUS (MORACEAE)

FICUS AUREA Nutt., FLORIDA STRANGLER FIG. An epiphyte, later becoming a tree, also cult. as an ornamental, in S. Fla.

Colletotrichum gloeosporioides Penz. (C. elasticae Tassi), anthracnose. Fla.
Fusarium moniliforme Sheldon, fruit rot. Calif.
Heterodera marioni (Cornu) Goodey, root knot.
Ophiodothella fici E. Bessey, black leaf spot. Fla.
Phlyctaena ficuum P. Henn., leaf spot. Fla.
Phyllosticta physopellae Dearn. & Barth. and P. roberti Boyer & Jacz., leaf spot. Fla.
Physopella fici (Cast.) Arth., rust (II, III). Fla.
Phytomonas tumefaciens (EFS. & Town.) Bergey, crown gall. Fla.

FICUS CARICA L., FIG. Native of SW. Asia, cult. in U. S. as a garden plant in Zone VI and southward, and commercially in Calif., La., and Texas.

Alternaria sp., fruit spot. Calif.; leaf spot, S. C.
Aspergillus niger V. Tiegh. (Sterigmatocystis ficuum (Reich.) P. Henn.), black mold, black "Smut", Calif., Wash.
Botryosphaeria ribis Gross. & Dug., dieback. Fla., Texas.
Botrytis cinerea Pers., fruit rot, Miss.; canker, dieback, Calif., Wash.
Capnodium sp., sooty mold. Texas.
(Cercospora bolleana (Thuem.) Speg.): Mycosphaerella bolleana.
(rusty leaf).
C. fici Heald & Wolf (C. ficina Tharp), leaf blotch. N. C. to Fla. and Texas.
(Cerotelium fici (Cast.) Arth.): Physopella fici.
Ceratostomella hystricina (Cke.) Sacc., S. C.
Colletotrichum gloeosporioides Penz.(C. carica Stevens & Hall, C. elasticae Tassi), anthracnose (fruit rot). N. C. to Texas. (Conidial stage of Glomerella cingulata.)
Corticium koleroga (Cke.) Höhn. (C. stevensii Burt), thread blight. Fla., La., Miss.
C. microsclerotia (Matz) Weber, web blight, leaf blight. Fla. to Texas.
C. salmonicolor Berk. & Br., limb blight. Gulf States. (Reported also as C. laetum Karst.)

FICUS--Continued

Diplodia natalensis Evans, fruit rot, twig blight. Texas. Conidial stage of Physalospora rhodina.
D. sycina Mont. var. syconophila Sacc., canker, dieback. N. C., Oreg., Texas.
Eutypa sp., leaf spot. Texas.
Eutypella fici Ell. & Ev., on dead twigs. La., Texas.
Fumago vagans Fr., sooty mold. Gulf States.
Fusarium sp., wilt, Ala.; fruit rot. N. C.
F. lateritium Nees, twig blight. Calif. Conidial stage of Gibberella baccata (Wallr.) Sacc.
F. moniliforme Sheldon (F. m. var. fici Caldis), endosepsis (internal fruit rot). Calif. (Conidial stage of Gibberella fujikuroi (Saw.) Wr.)
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose (fruit rot, leaf spot). N. C. to Fla. and Texas.
Heterodera marioni (Cornu) Goodey, root knot. Southern States to Calif.
(Kuehneola fici (Cast.) Butl.): Physopella fici.
Macrophoma fici Alm. & Cam., canker (fruit). La., N. C. Texas.
Megalonectria pseudotrichia (Schw.) Speg. (Stilbum cinnabarinum (Mont.) Sacc.), canker, twig blight. La., Texas.
Mycosphaerella bolleana Higgins (Cercospora bolleana (Thuem.) Speg.), leaf spot. N. C. to Texas, T. H.
Nectria ?cinnabarina Tode ex Fr. (Tubercularia vulgaris Tode), canker, twig blight. Texas.
Oospora sp., scuring of fruit. Texas.
Phomopsis cinerescens (Sacc.) Trav., on branches. Calif. (=Phoma cinerescens Sacc. and probably Libertella ulcerata Massee; causes a branch and twig canker of figs in Europe.)
Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Texas.
Physalospora fusca N. E. Stevens and P. obtusa (Schw.) Cke. on branches. Ala., Fla.
P. rhodina (Berk. & Curt.) Cke. (Diplodia natalensis Evans), canker, dieback. Ala., Fla., Texas.
Physopella fici (Cast.) Arth., rust II. N. C. to Texas, West Indies and Central America.
Phytomonas tumefaciens (EFS. & Town.), crown gall. Texas.
Pratylenchus musicola (Cobb.) Filip. and P. pratensis (De Man.) Filip., in roots. Calif.
Rhizoctonia sp., collar rot. Texas.
(R. microsclerotia Matz): Corticium microsclerotia.
Rhizopus nigricans Ehr., soft rot (fruit). Calif., Gulf States.
Saccharomyces sp., scuring of fruit. Calif., N. C., Texas, Wash.
Schizophyllum commune Fr., wood rot. Calif.
Sclerotinia sclerotiorum (Lib.) DBy., canker, twig blight. Calif., Texas.
Sclerotium rolfsii Sacc., Southern blight. Fla.
Septobasidium sp., felt fungus, Miss.

FICUS--Continued

(Stilbum cinnabarinum (Mont.) Sacc.): Megalonectria pseudotrichia.
Trichothecium roseum (Pers.) Lk., fruit rot. Gulf States.
Tubercularia spp. (T. ailanthi Cke. on twigs, Ala.; T. fici Edg., Ga. La., Texas, Va.; and T. vulgaris Tode ex Fr., Calif., Texas) cf. Megalonectria and Nectria.
Little leaf, -- mineral deficiency, probably zinc. Calif.
Mosaic, -- Ficus virus 1. Calif., ?Va.

FICUS ELASTICA Roxb., INDIA RUBBERTREE, RUBBER-PLANT. Native of tropical Asia, cult. under glass and in the open in the far South; including the var. VARIEGATA.

Alternaria sp., leaf spot. Ind., Ohio, Texas.
Glomerella cingulata (Ston.) Spauld. & Schrenk. (Colletotrichum elasticae Tassi, C. gloeosporioides Penz., Gloeosporium elasticae Cke. & Mass., G. intermedium Sacc.), anthracnose, leaf spot. General.
Heterodera marioni (Cornu) Goodey, root knot.
Leptostromella elastica Ell. & Ev., leaf spot. Northeastern States.
Mycosphaerella bolleana Higgins, leaf spot. Ga.
Phoma atrocincta Sacc., on twigs. Fla.
Phyllosticta roberti Boyer & Jacz. and Phyllosticta sp., leaf spot. Gulf States, Md., N. Y., T. H., West Indies.
Physalospora rhodina (Berk. & Curt.) Cke., on branches. Ga.
Phytomonas tumefaciens (EFS. & Town.) Bergey, crown gall.
Stemphylium elasticae Patterson, leaf spot. (Probably secondary and not distinguishable from Alternaria spp.)
Trabutia (Phyllachora) ficuum (Niessl.) Theiss. & Syd., black leaf spot. Fla.
Trametes persoonii Mont., heart rot. T. H.

FICUS spp.

Aphelenchoides fragariae Ritz. Bos, leaf nematode.
Catacauma portoricensis Chardon, black leaf spot. P. R.
Cephaleuros virescens Kze., algal spot. P. R.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Hendersonula findens (Sacc.) Tassi, on bark. Ga.
Ophiodothella floridana Chardon, black leaf spot. Fla. P. R. (Possibly the same as O. fici E. Bessey, which has priority, and the fungus reported as Phyllachora ficuum Niessl on Ficus in Fla.; one reported as Rhytisma sp. on F. benghalensis in Fla. may also be the same.)
Physalospora hoyae Höhn., on branches. P. R.
Thielaviopsis paradoxa (De Seynes) Höhn., on leaves. Fla.

FIRMIANA (STERCULIACEAE)

FIRMIANA SIMPLEX (L.) W. F. Wight (F. platanifolia R. Br.), PHOENIX-TREE. Ornamental tree of E. Asia cult. in Zone VII.

Corticium (Rhizoctonia) microsclerotia (Matz.) Weber, web-blight. Fla.

FORESTIERA (OLEACEAE)

FORESTIERA spp., especially F. ACUMINATA (Michx.) Poir (Adelia acuminata Michx.), FORESTIERA, SWAMP-PRIVET. Shrubs or small trees of S. and SW. U. S. and Pacific Coast, several cult. as ornamentals.

Cercospora bernardiae F. L. Stevens, on leaves. P. R.
Coleosporium minutum Hedgc. & Hunt, rust (II, III). Fla., Texas. O and I (Peridermium minutum) on Pinus spp.
Microsphaera alni DC. ex Wint., powdery mildew. Ill., Texas.
Phoradendron flavescens (Pursh) Nutt., mistletoe. Texas. P. villosum (Pursh) Nutt., Calif., Oreg.
Puccinia peridermiospora (Ell. & Tr.) Arth. (P. fraxinata Arth.), rust (O, I). Fla., Texas. II and III on Spartina spp.

FORSYTHIA (OLEACEAE)

FORSYTHIA spp., especially F. SUSPENSA (Thunb.) Vahl and F. VIRIDISSIMA Lindl., FORSYTHIA, GOLDENBELL. Ornamental shrubs of Europe and Asia, widely cult. in Zone V and southward (also farther north in favorable sites).

Alternaria sp., leaf spot. Iowa.
Heterodera marioni (Cornu) Goodey, rootknot.
Phomopsis sp., stem galls. Ky.
Phyllosticta discincola Ell. & Ev., leaf spot. Md. P. forsythiae Sacc., Conn.; P. terminalis Ell. & Mart., Fla., Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Phytomonas tumefaciens (EFS. & Town.) Bergey, crown gall. Miss., N. J., Texas.
Sclerotium rolfsii Sacc., Southern blight. Ga.

FORTUNELLA (RUTACEAE)

FORTUNELLA MARGARITA (Lour) Swingle (and other spp.), KUMQUAT. Trees or shrubs of China cult. for fruit and as ornamentals in Gulf States and Calif.

Alternaria citri Ell. & Pierce, black rot. Calif.
Cephaleuros virescens Kze., algal leaf spot. Gulf States.

FORTUNELLA--Continued

Diaporthe citri Wolf, stem-end rot. Calif.
Phoma socia Wolf, on twigs. Ala.
Phyllosticta citricola Hori, leaf spot. Miss.
Phytomonas citri (Hasse) Bergey, canker. Ala.
Tylenchulus semi-penetrans Cobb, in roots. Fla.

FOUQUIERIA (FOUQUIERIACEAE)

FOUQUIERIA SPLENDENS Engelm., OCOTILLO. Shrub bearing showy flowers and edible fruit, in Growth Regions 10, 11, 16.

Aecidium cannonii Griff., rust (0, I). Ariz.

FRANSERIA (COMPOSITAE)

FRANSERIA spp., BUR-SAGE. Shrubs of Southwestern deserts, of some forage value.

Erysiphe cichoracearum DC., powdery mildew. Ariz.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Puccinia splendens Vize, rust (0, I, II, III). Ariz., Calif.

(Division of Mycology and Disease Survey.)

MARCH WEATHER

From the U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for the week ending April 8.

From time to time recently attention has been called in this bulletin to the persistence of a definite current weather pattern in the United States. This phenomenon has been characterized from week to week by relatively low temperatures in the eastern portion of the country and abnormal warmth in more western sections; also extreme dryness in interior States and almost unprecedented continuous heavy rains over a large southwestern area. A comparison of weekly data published in the bulletin since the first of the year emphasizes the persistence of this general weather pattern.

On a monthly basis, compilations of the temperature and precipitation data for February and March show a remarkable similarity in conditions for these periods. Occasionally, for the country as a whole, records for a single weather element, temperature or precipitation, may substantially conform in summarizations for 2 succeeding months, but it is very unusual for such combinations to exhibit recognizable, widespread similarity in both elements.

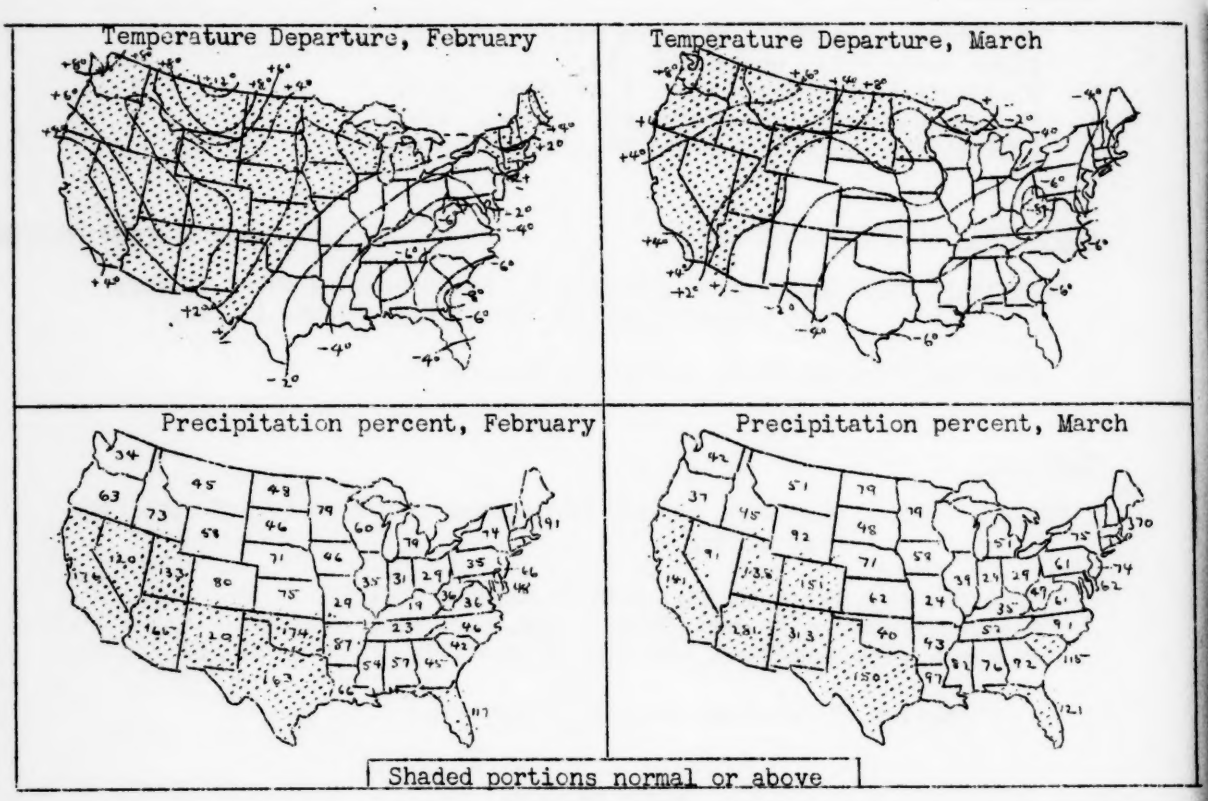

Figure I. Departure of Mean Temperature from Normal and Percent of Normal Precipitation, February and March, 1941.

Figure I shows the departure of mean temperature from normal for February and March separately, and also the percentage of normal precipitation, by States, for these 2 months. It is not believed that the historical climatological records of the United States, if minutely searched, would show so similar agreements, temperature and precipitation in combination, as given on these charts. They conform to the general recent pattern as indicated above.

March was abnormally cold from the Great Lakes southward, and also in the west Gulf area, with the temperature averaging from 4° to 8° below normal. The far Northwest and West were decidedly warm, with the greatest plus anomalies, up to 8°, appearing in the former area. Over a broad north-south belt through the center of the country the monthly averages were more seasonable.